CONNECTOR DEVICE FOR CARD

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Inventor: KURODA YOSHINARI
Applicant: ALPS ELECTRIC CO LTD
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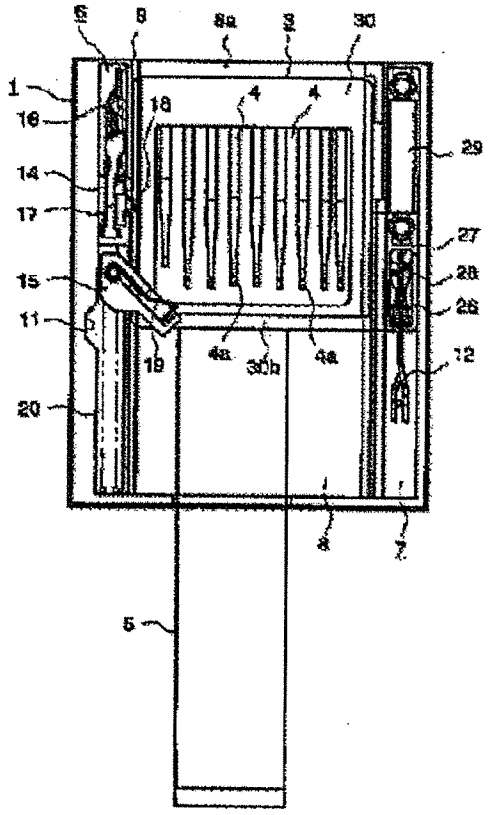
Abstract of **JP2003031285**

PROBLEM TO BE SOLVED: To provide a connector device for a card, easy to use and capable of selectively mounting a long SD card at a desired position where an amount of its insertion is different from other positions. SOLUTION: This connector device is provided with a header member 3 capable of reciprocating between a first holding position adjacent to an opening end 8a and a second holding position adjacent to an inner part while having plural terminal pieces 4 which can be brought into contact with the group of external connection terminals of the SD card, a holding means 7 capable of selectively holding the header member 3 at the first holding position or the second holding position, and a FPC 5 connected to each terminal piece 4 of the header member 3 by being derived from the device body, and the header member 3 is moved to the second holding position by being driven by the SD card, when the long SD card is pushed in a second mounting position where it is in a stored condition.



* NOTICES *

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CLAIMS

[Claim(s)]
[Claim 1]A connector device for cards constituting so that said header member in said 1st holding position may move to said 2nd holding position, when it has the following and said 2nd fixing point is made to equip with said card.
having the insertion space where a card which provided an external connection terminal group is inserted from the open end side -- and said card -- an insertion amount into said insertion space -- smallness -- the 1st fixing point and insertion amount -- size -- housing with which the 2nd fixing point can be equipped selectively.
Have two or more terminal strips which can contact said external connection terminal group, and reciprocation moving is possible between the 1st holding position in said insertion space, and the 2nd holding position, A header member in contact with said external connection terminal group of said card with which said external connection terminal group of said card with which said 1st fixing point was equipped with said two or more terminal strips in said 1st holding position was contacted, and said 2nd fixing point was equipped with said two or more terminal strips in said 2nd holding position.
Holding mechanism which has a mechanism in which can hold said header member selectively to said 1st holding position and said 2nd holding position, and this header member is moved to said 1st holding position from said 2nd holding position.
A cable which was drawn from the main frame and connected to said terminal strip group of said header member.

[Claim 2]A connector device for cards, wherein said cable consists of flexible printed circuit boards in a statement of claim 1.
[Claim 3]A connector device for cards, wherein said each terminal strip is supported by end of a near side of said header member at cantilever form, and said flexible printed circuit board is prolonged from the back side of said housing to this side and is soldered to a fixed end part of each of said terminal strip in a statement of claim 2.
[Claim 4]A slider united with said holding mechanism by said header member in one statement of claims 1-3, An engaging pin which moves along a cam groove which has a pin locking part with movement of this slider, An energizing member which turns said slider to an eject direction of said card, and carries out elastic energization is provided, If said pin locking part is made to stop said engaging pin, movement of said slider will be prevented and said header member will be held in said 2nd holding position, And if said engaging pin is made to secede from said pin locking part, said slider will be energized by said energizing member and will move to said eject direction, and.
A connector device for cards constituting so that said header member may move to said 1st holding position from said 2nd holding position and may be held in this 1st holding position.
[Claim 5]A statement of claim 4 characterized by comprising the following.
It has an ejecting means which can discharge said card with which said 1st fixing point is equipped, an insertion eject direction of said card is met at this ejecting means, and it is the 1st slider in which reciprocation moving is possible.
The 1st engaging pin that moves along the 1st cam groove with movement of this 1st slider.

The 1st energizing member that turns said 1st slider to said eject direction, and carries out elastic energization.
It is supported pivotally by said 1st slider, enabling free rotation, and is an engaging arm which can give power to said eject direction to said card.
A rotation control part which regulates rotation to a way outside said engaging arm when an insertion point of said card has not arrived at said 1st fixing point.
A rotation allowing part which permits rotation to a way outside said engaging arm in a process which said card moves to said 2nd fixing point from said 1st fixing point and to which this engaging arm is evacuated.

[Claim 6]As opposed to said card which is two kinds from which the length of an insertion eject direction differs in one statement of claims 1-5, A size in which this card projects from said open end to a method of outside when said 1st fixing point is equipped with one short ** card, A connector device for cards characterized by setting up said 1st and 2nd fixing points so that a size in which this card projects from said open end to a method of outside may become an abbreviated EQC, when said 2nd fixing point is equipped with a long ** card of another side.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention equips with the card called a sized memory card, an SD card, etc., The connector device for cards connected to the electronic circuit in which the external connection terminal group provided in this card was provided by electronic devices, such as a personal computer, is started, and it is especially related with the connector device for cards corresponding to the formation of long ** of the card accompanying multi-functionalization.
[0002]
[Description of the Prior Art]The card (an SD card is called hereafter) with which electronic devices, such as a personal computer and an electronic camera, are equipped enabling free attachment and detachment and which can perform writing and reading of information from before is known. As for this kind of card, contour shape is formed in the card shape of an approximately rectangle.
Two or more external connection terminals are installed successively by the end part of one side.
The electronic device which can equip with this SD card is equipped with the circuit board in which the necessary electronic circuit was established, and the connector device for cards for connecting the external connection terminal group of an SD card to this electronic circuit.
[0003]Such a connector device for cards is equipped with the housing which has the insertion space where an SD card is inserted from the open end side, two or more terminal strips which it is fixed to this housing and exposed in insertion space, and the discharge mechanism for discharging the SD card with which it was equipped.
[0004]Housing is usually constituted combining the frame which consists of insulating materials, and covering which consists of a metallic material or an insulating material, and the insertion space for SD cards is formed between a frame and covering. It exposes in insertion space and the external connection terminal of an SD card, the contact portion which can be contacted, and the soldering part soldered to the electronic circuit established in electronic devices, such as a personal computer, are provided in each terminal strip.
When the predetermined fixing point is equipped with the SD card inserted in insertion space, it is designed so that the external connection terminal group may contact the contact portion of each terminal strip.

[0005]The thing of composition of having had the coil spring which engages with an SD card as a discharge mechanism, and carries out elastic energization of the slider in which reciprocation moving is possible, and this slider to a card ejecting direction, and the engaging pin guided to a heart shape cam groove is known. If an operator pushes in with fingers the end (rear end part) of the near side of the SD card with which the predetermined fixing point is equipped by making a slider and an engaging pin collaborate, with a slider, this card moves to the front and can discharge this thing easily.
[0006]

[Problem(s) to be Solved by the Invention]By the way, it not only uses an SD card as a mere storage in recent years, but, The requests of using it as communication equipment by providing a transmission and reception circuit etc. are mounting, and in connection with it, compared with the old SD card, although terminal specification is the same, the appearance of the SD card which enlarged the linear dimension is expected. For example, the antenna circuit for short-distance-radio communication is established in the back end side of the SD card of long **, Only when using this antenna circuit, the connector device is equipped with the SD card by the shallow insertion condition, and when not using an antenna circuit, the usage of inserting an SD card in a connector device by a deep insertion condition will fully be considered from now on.
[0007]However, the conventional connector device for cards, Since it does not have structure supposing equipping with the SD card of this long **, even if specified quantity insertion of this SD card can be carried out and it can aim at electric connection, when not using an antenna circuit, for example, it cannot be said that this SD card is inserted deeply and stored. Namely, if you are going to make it apply the conventional connector device for cards to an SD card usually longer than elegance, this SD card must be changed into the state where it was made to project greatly, from the open end of the insertion space of housing to this side, Electronic device bodies, such as a notebook sized personal computer, must be carried, equipping a connector device with this SD card it not only must say that appearance is bad, but, and the problem that it is very user-unfriendly arises.
[0008]This invention is made in order to cancel the defect of this conventional technology, the purpose can make the position of the request from which an insertion amount differs equip with the SD card of long ** selectively, and there is user-friendliness in providing the good connector device for cards.
[0009]
[Means for Solving the Problem]In order to attain the purpose mentioned above, a connector device for cards by this invention, It has the insertion space where a card (SD card) which provided an external connection terminal group is inserted from the open end side, and said card -- an insertion amount into said insertion space -- smallness -- the 1st fixing point and insertion amount -- size -- selectively to the 2nd fixing point with housing with which it can equip. Have two or more terminal strips which can contact said external connection terminal group, and reciprocation moving is possible between the 1st holding position in said insertion space, and the 2nd holding position, In said 1st holding position, said two or more terminal strips contact said external connection terminal group of said card with which said 1st fixing point was equipped, And a header member to which said two or more terminal strips contact said external connection terminal group of said card with which said 2nd fixing point was equipped in said 2nd holding position, Holding mechanism which has a mechanism in which can hold said header member selectively to said 1st holding position and said 2nd holding position, and this header member is moved to said 1st holding position from said 2nd holding position, When it has a cable which was drawn from the main frame and connected to said terminal strip group of said header member and said 2nd fixing point is made to equip with said card, It constituted so that said header member in said 1st holding position might move to said 2nd holding position.
[0010]Since the connector device constituted in this way can insert an SD card of short ** and can make the 1st fixing point and the 2nd fixing point the 1st fixing point not only being made to equip but equip with an SD card of long **, If expose an antenna circuit built, for example in the SD card when making the 1st fixing point equip with an SD card of long **, and it can be used as communication equipment, and an SD card of long ** is inserted deeply and the 2nd fixing point is made to equip, It can be used as a storage or can hold to a housed state convenient to carry. and an SD card of long ** with which the 1st fixing point is equipped and which is contacting an external connection terminal group in a terminal strip group of a header member -- an operator -- fingers -- a method of the back -- ** -- by pushing in a fixed quantity, A header member driven to this SD card can be moved from the 1st holding position to the 2nd holding position, and can make it hold to holding mechanism, and. Since the 2nd fixing point can be made to equip with this SD card, this SD card can be moved from the 1st fixing point to the 2nd fixing point, with contact with an external connection terminal group and a terminal strip group maintained. In

this case, since an SD card does not overcome a terminal strip group and does not necessarily move to the 2nd fixing point, it can push into a method of the back smoothly. When the 2nd fixing point is equipped with an SD card of long **, Since this SD card can be driven by a header member and can be moved to the front by moving a header member to the 1st holding position from the 2nd holding position by maintenance releasing operation of holding mechanism, etc., This SD card can be smoothly moved from the 2nd fixing point to the 1st fixing point, with contact with an external connection terminal group and a terminal strip group maintained.
[0011]In composition which this invention mentioned above, if said cable is a flexible printed circuit board, Since an adverse effect stops attaining to a connected state of each terminal strip and the main frame even if soldering with each terminal strip of a header member is not only easy, but it moves a header member between the 1st holding position and the 2nd holding position by sagging a flexible printed circuit board, it is desirable. Each terminal strip is supported by end of a near side of a header member at cantilever form in that case, and. If a flexible printed circuit board is prolonged from the back side of housing to this side and is soldered to a fixed end part of each terminal strip, it will become easy to secure sufficient length which it becomes easy to attain a miniaturization which stopped overall depth of housing, and guaranteed flexibility to a flexible printed circuit board.
[0012]A slider which wants to mention this invention above and which shifted and was united with said holding mechanism by said header member in that composition, An engaging pin which moves along a cam groove which has a pin locking part with movement of this slider, An energizing member which turns said slider to an eject direction of an SD card, and carries out elastic energization is provided, If said pin locking part is made to stop said engaging pin, movement of said slider will be prevented and said header member will be held in said 2nd holding position, And if said engaging pin is made to secede from said pin locking part, said slider will be energized by said energizing member and will move to said eject direction, and. If said header member moves to said 1st holding position from said 2nd holding position and is held in this 1st holding position, an operator will push in an SD card with which the 1st fixing point is equipped, By carrying out specified quantity movement of the header member from the 1st holding position to a method of the back, a pin locking part of a cam groove can be made to be able to stop an engaging pin, and this header member can be held to the 2nd holding position. An operator pushes in an SD card with which the 2nd fixing point is equipped, By making an engaging pin secede from a pin locking part via a header member, this header member can be moved from the 2nd holding position to the 1st holding position by elastic force of an energizing member, and it can hold to this 1st holding position. Therefore, operation which makes a header member hold to the 1st holding position and 2nd holding position selectively, or moves it to them among both holding positions can be performed simply and smoothly via an SD card of long **.
[0013]Have an ejecting means which can discharge an SD card with which said 1st fixing point is equipped in this composition, and along an insertion eject direction of an SD card to this ejecting means The 1st slider in which reciprocation moving is possible, The 1st engaging pin that moves along the 1st cam groove with movement of this 1st slider, The 1st energizing member that turns said 1st slider to said eject direction, and carries out elastic energization, It is supported pivotally by said 1st slider, enabling free rotation, and to an SD card An engaging arm which can give power to said eject direction, A rotation control part which regulates rotation to a way outside said engaging arm when an insertion point of an SD card has not arrived at said 1st fixing point, If a rotation allowing part which permits rotation to a way outside said engaging arm in a process which an SD card moves to said 2nd fixing point from said 1st fixing point and to which this engaging arm is evacuated is provided, As an SD card is the 1st fixing point and 2nd fixing point, in order that an engaging arm may evacuate to a rotation allowing part in a stage inserted [to], Retreating a slider of said holding mechanism, an SD card can be further stuffed into a method of the back, and it can be made to reach to the 2nd fixing point, without retreating the 1st slider more. Therefore, if the 1st energizing member is a coil spring, for example, the amount of elasticity can be controlled and reinforcement can be attained.
[0014]An SD card which is two kinds which want to mention this invention above, and from which it shifts and the length of an insertion eject direction differs in that composition is

received, A size in which this card projects from said open end to a method of outside when said 1st fixing point is equipped with one short ** card, If said 1st and 2nd fixing points are set up so that a size in which this card projects from said open end to a method of outside may serve as an abbreviated EQC, when said 2nd fixing point is equipped with a long ** card of another side, since exterior communalization can be attained, design nature at the time of use will improve.
[0015]
[Embodiment of the Invention]The top view which drawing 1 omits covering of the connector device for cards concerning the example of an embodiment, and is shown when an embodiment of the invention is described with reference to drawings, The top view of the housing of this connector device and drawing 3 drawing 2 The top view of the header member of this connector device, The flexible printed circuit board by which drawing 4 is connected to this header member. The top view of (calling FPC hereafter), the top view of a header member in which drawing 5 soldered this FPC, The header member which shows drawing 5 drawing 6 and the sectional view of FPC, the explanatory view of the cam groove where drawing 7 was provided in the 1st discharge maintaining structure of this connector device, and drawing 8 are the explanatory views of the cam groove established in the 2nd discharge maintaining structure of this connector device.
[0016]The connector device for cards shown in these figures is for being attached to electronic devices, such as a personal computer, and equipping with an SD card, and can be connected to the electronic circuit in which the external connection terminal group of the SD card with which the prescribed position was equipped was provided by the electronic device body. And this connector device for cards not only can equip with the SD card of short **, but is constituted so that it can equip also with the SD card of long **.
[0017]When concrete composition is described, this connector device for cards, The housing which combines covering which consists of the frame 1 which consists of insulating materials, and a metallic material, and which is not illustrated, Have an external connection terminal group of an SD card, and two or more terminal strips 4 which can be contacted, and The header member 3 in which reciprocation moving is possible within the frame 1, Outline composition is carried out by FPC5 which was drawn from the electronic device body and soldered to terminal strip 4 group of the header member 3, the 1st discharge maintaining structure 6 provided in the one side part of the frame 1, and the 2nd discharge maintaining structure 7 provided in the other side portion of the frame 1.
[0018]Between the frame 1 of said housing, and covering, the insertion space 8 where an SD card is inserted from the open end 8a side is formed. As shown in drawing 2, the cam groove 9, the regulation wall 10, and the notch 11 which make a part of 1st discharge maintaining structure 6 are formed in the one side part of the frame 1, and the heart shape cam groove 12 which makes a part of 2nd discharge maintaining structure 7 is formed in the other side portion of the frame 1.
[0019]As shown in drawing 3, the header member 3 comes to fix two or more terminal strips 4 to cantilever form at the base body 30 made of a synthetic resin which has the window hole 30a and the press wall 30b, and fixes terminal strip 4 group to the base body 30 by insert molding in this example of an embodiment, but. Heat may attach terminal strip 4 group with a bundle etc. after shaping of the base body 30. This header member 3 can be selectively held according to the 2nd discharge maintaining structure 7 to the 1st holding position of the open end 8a slippage in the insertion space 8, and the 2nd holding position of back slippage, and reciprocation moving is possible for it among these both holding positions. As shown in drawing 6, the contact portion 4a currently formed in the free end section of each terminal strip 4 has pushed out between base body 30 absentminded from the window hole 30a, And since the relative position relation of each contact portion 4a is set up on a par with the relative position relation (terminal arrangements) of each external connection terminal of an SD card, each contact portion 4a can be made to contact elastically each external connection terminal of the SD card inserted into the insertion space 8. Since each land 5a of FPC5 shown in drawing 4 is soldered to the fixed end part of each terminal strip 4 currently supported by the end of the near side (open end 8a side) of the header member 3, Even if it carries out the moved back of the header member 3

within the frame 1, it bends, as shown to drawing 6 in FPC5, and the electric connection between each terminal strip 4 and an electronic device body is maintained.
[0020]the 1st discharge maintaining structure 6 -- an SD card -- an insertion amount -- smallness -- the 1st fixing point and insertion amount -- size -- it is a mechanism for making the 2nd fixing point equip selectively, or making the SD card with which the 1st fixing point is equipped discharge. And the external connection terminal group can be contacted to the contact portion 4a of each terminal strip 4 of the header member 3 currently held in said 1st holding position by inserting an SD card to near the center section in the insertion space 8, and making the 1st fixing point equip. The external connection terminal group can be contacted to the contact portion 4a of each terminal strip 4 of the header member 3 currently held in said 2nd holding position by inserting an SD card to the inner in the insertion space 8, and making the 2nd fixing point equip.
[0021]If the composition of the 1st discharge maintaining structure 6 is explained in detail, this 1st discharge maintaining structure 6 will be provided with the following.
The insertion eject direction of an SD card is met and it is the 1st slider 14 in which reciprocation moving is possible.
The engaging arm 15 which is supported pivotally by this slider 14 enabling free rotation and for which an SD card engages [a front tip part and].
The 1st engaging pin 16 that moves along said cam groove 9 with movement of the 1st slider 14. The pressure plate 17 currently pressed down so that this engaging pin 16 may not be omitted from the cam groove 9, The 1st elastic piece 18 that could engage with the crevice established in one side edge of an SD card, and was held at the 1st slider 14, The 2nd elastic piece 19 that could engage with this crevice of the SD card and was held at the engaging arm 15, and the 1st coil spring 20 that turns the 1st slider 14 to a card ejecting direction, and carries out elastic energization.
Said regulation wall 10 and the notch 11 of the frame 1 are also a component of the 1st discharge maintaining structure 6, and the regulation wall 10 regulates the rotation to a way outside the engaging arm 15, when the insertion point of an SD card has not arrived at the 1st fixing point. On the other hand, the notch 11 permits the rotation to a way outside the engaging arm 15, as an SD card moves to the 2nd fixing point from the 1st fixing point, and it evacuates this engaging arm 15.
[0022]The heart shape cam groove 21 which has the pin locking part 21a for stopping the 1st engaging pin 16 and holding an SD card to the 1st fixing point in the cam groove 9 as shown in drawing 7, The 1st guide rail 22 that is open for free passage to the heart shape cam groove 21 by the upstream of the pin locking part 21a, and extends to the method of the back, The 2nd guide rail 23 that is open for free passage to the heart shape cam groove 21 by the downstream of the pin locking part 21a, and extends to the method of the back, The feedback loop 24 which guides the course of the 1st engaging pin 16 in the process which an SD card moves to the 1st fixing point from the 2nd fixing point, The extension way 25 which is open for free passage to both the guide rails 21 and 22 and the feedback loop 24, and extends to the method of the back is formed, and the 2nd guide rail 23 has been an advance course which makes an SD card movable from the 1st fixing point to the 2nd fixing point. In the feedback loop 24, the return pin locking part 24a for stopping the 1st engaging pin 16 while moving this feedback loop 24, and holding an SD card to the 1st fixing point is formed, and this feedback loop 24 makes the 2nd guide rail 23 open for free passage by the downstream of the return pin locking part 24a. And since movement of the 1st slider 14 is prevented when the 1st engaging pin 16 is stopped by the pin locking part 21a or the return pin locking part 24a, the SD card which is engaging with this slider 14 via the 1st elastic piece 18 is held in the 1st fixing point.
[0023]On the other hand, the 2nd discharge maintaining structure 7 is a mechanism for holding the header member 3 selectively to the 1st holding position and 2nd holding position, or moving the header member 3 currently held in the 2nd holding position to the 1st holding position. This 2nd discharge maintaining structure 7 is provided with the following.
It is fabricated in one with the base body 30 of the header member 3, the insertion eject direction of an SD card is met, and it is the 2nd slider 26 in which reciprocation moving is

possible.
The 2nd engaging pin 27 that moves along said heart shape cam groove 12 with movement of this slider 26.
The pressure plate 28 currently pressed down so that this engaging pin 27 may not be omitted from the heart shape cam groove 12.
The 2nd coil spring 29 that turns the 2nd slider 26 to the eject direction of an SD card, and carries out elastic energization.
As shown in drawing 8, when the pin locking part 12a is formed in the heart shape cam groove 12 and an SD card is in the 2nd fixing point, the 2nd engaging pin 27 is stopped by this pin locking part 12a, and prevents movement of the 2nd slider 26. At this time, the 2nd elastic piece 19 held at said engaging arm 15 engages with the crevice of an SD card, and an SD card can be held now to the 2nd fixing point.
[0024]Next, operation of the connector device for cards constituted in this way is explained with reference to drawing 9 - drawing 18. First, the operation in the case of using SD card 60 longer than SD card 50 of short ** adopted widely now is explained using drawing 9 - drawing 17.
[0025]External connection terminal 61 group which can contact the contact portion 4a of each terminal strip 4 of the header member 3 is provided in the path-of-insertion front end side of SD card 60 of long **. The crevice 62 in which the elastic pieces 18 and 19 of the 1st discharge maintaining structure 6 and engagement are possible is established in one side edge of this SD card 60. As for SD card 60 of this long **, all of the width dimension, the terminal arrangements of external connection terminal 61 group, the distance from a front tip to the crevice 62, etc. are designed on a par with SD card 50 of short **. However, the antenna circuit which is not illustrated is established in the path-of-insertion back end side of SD card 60 of long **, and to use this antenna circuit by the best possible sensitivity situation, it is necessary to equip a connector device with a rear end portion in the state where it was made to expose to the front.
[0026]Drawing 9 is a top view immediately after starting insertion of SD card 60 of long ** to the connector device for cards concerning this example of an embodiment, and in this state, since the header member 3 is forced near the open end 8a of the frame 1 according to the elastic force of the 2nd coil spring 29, it is held in the 1st holding position. If SD card 60 is inserted to the position shown in drawing 9, the 1st elastic piece 18 will engage with the crevice 62, and the engaging arm 15 will contact the front tip part of SD card 60. Therefore, when the operator inserts SD card 60 further, the engaging arm 15 by which the rotation to the method of outside is regulated with the regulation wall 10 of the frame 1 will be stuffed into SD card 60, The 1st slider 14 and engaging arm 15 move to the method of the back following SD card 60, and the 1st engaging pin 16 moves along the heart shape cam groove 21 with movement of this slider 14.
[0027]And since the 1st engaging pin 16 will move to the 1st guide rail 22 from the heart shape cam groove 21 as an arrow shows to drawing 10 if SD card 60 is pushed in to the certain quantity back rather than the 1st fixing point, If pushing operation power is removed, the 1st slider 14 and engaging arm 15 are put back to the front by the elastic force of the 1st coil spring 20, and the pin locking part 21a can be made to stop the 1st engaging pin 16. Where external connection terminal 61 group is contacted to the contact portion 4a of each terminal strip 4 of the header member 3 currently held in the 1st holding position by this, SD card 60 will be held in the 1st fixing point, and it becomes possible to use the antenna circuit exposed to the front by a good sensitivity situation.
[0028]What is necessary is to stuff SD card 60 of the state of drawing 10 into the method of the back shallowly, and just to make the 1st engaging pin 16 secede from the pin locking part 21a, when discharging SD card 60 with which the 1st fixing point was equipped in this way. Since the 1st engaging pin 16 moves the inside of the heart shape cam groove 21 to the lower stream by this at drawing 9 as an arrow shows, SD card 60 is put back to a discharge position by the 1st slider 14 and engaging arm 15 that move to the front by the elastic force of the 1st coil spring 20. That is, the operator can make SD card 60 currently held in the 1st fixing point discharge by easy operation of a one push.
[0029]In order to expose an antenna circuit, in making it move to the 2nd fixing point and making into a housed state SD card 60 currently held to the 1st fixing point, the operator stuffs SD card

60 of the state of drawing 10 into the method of the back. Then, with movement of the 1st slider 14, the 1st engaging pin 16 moves to the extension way 25 through the 2nd guide rail 23 from the heart shape cam groove 21, as shown in drawing 11 at an arrow. Since it rotates to the method of outside and evacuates into the notch 11 of the frame 1 while the engaging arm 15 is pushed on SD card 60 when SD card 60 is inserted to the position of drawing 11, movement to the method of the back of the engaging arm 15 is regulated. Therefore, even if SD card 60 is further stuffed into the method of the back, the 1st slider 14 has stopped and the 1st elastic piece 18 secedes from the crevice 62 of SD card 60. However, since the front tip part will push in the press wall 30b of the base body 30 if SD card 60 is stuffed into the method of the back from the 1st fixing point, The header member 3 and the 2nd slider 26 move to the method of the back following movement to the method of the back of SD card 60, and the 2nd engaging pin 27 moves along the heart shape cam groove 12 in connection with it. Since both 3 and 60 will move in one if the header member 3 is stuffed into SD card 60 in this way, contact with the contact portion 4a of each terminal strip 4 and external connection terminal 61 group does not break off.

[0030]And since the 2nd engaging pin 27 moves the inside of the heart shape cam groove 12 to drawing 12 by pushing in SD card 60 to the certain quantity back rather than the 2nd fixing point as an arrow shows, If pushing operation power is removed, the header member 3 and the 2nd slider 26 will be put back to the front by the elastic force of the 2nd coil spring 29, the pin locking part 12a can be made to stop the 2nd engaging pin 27, and the header member 3 will be held by this in the 2nd holding position. The 2nd elastic piece 19 is entering and engaging with the crevice 62 of SD card 60 in this state. That is, where external connection terminal 61 group is contacted to the contact portion 4a of each terminal strip 4 of the header member 3 currently held in the 2nd holding position, SD card 60 will be held in the 2nd fixing point. Although SD card 60 can be made by making the 2nd fixing point equip in this way with the housed state which does not project greatly to the front, if a receiving condition avoids, an antenna circuit can also be used with this housed state.

[0031]What is necessary is just to stuff SD card 60 of the state of drawing 12 into the method of the back shallowly, in moving SD card 60 of the housed state currently held to the 2nd fixing point to the 1st fixing point. Since the 2nd engaging pin 27 secedes from the pin locking part 12a, and it moves the inside of the heart shape cam groove 12 to the lower stream by this at drawing 13 as an arrow shows, The header member 3 and the 2nd slider 26 move to the front by the elastic force of the 2nd coil spring 29, and therefore, SD card 60 is energized by the press wall 30b, and moves to the front. As a result, since the engaging arm 15 evacuated to the notch 11 rotates to an inner direction and the 1st slider 14 moves to the front, As shown in drawing 14 (a), the 1st engaging pin 16 moves to the feedback loop 24 from the extension way 25, as further shown in drawing 14 (b), the 1st engaging pin 16 is stopped by the return pin locking part 24a of the feedback loop 24, and SD card 60 is put back to the 1st fixing point. In this state, to the 1st holding position, the header member 3 returns and is held. That is, the operator can set it as the state where moved SD card 60 currently held in the 2nd fixing point to the 1st fixing point by easy operation of the one push, and the antenna circuit was exposed. In and the process in which SD card 60 is moved to the 1st fixing point from the 2nd fixing point. Since contact with external connection terminal 61 group and the contact portion 4a of each terminal strip 4 does not break off, for example, while using the antenna circuit by the housed state, when sensitivity falls, an antenna circuit can be exposed only by operation of a one push to SD card 60, sensitivity can be raised in an instant, and user-friendliness is markedly alike and becomes good. The courses which the 1st engaging pin 16 passes differ by the case where SD card 60 moves to the 2nd fixing point from the 1st fixing point, and the case where it moves to the 1st fixing point from the 2nd fixing point conversely so that clearly, if drawing 10 - drawing 14 are seen.

[0032]In this way, when moving SD card 60 to the 2nd fixing point again after changing into the state where moved SD card 60 from the 2nd fixing point to the 1st fixing point, and the antenna circuit was exposed, the operator should just stuff SD card 60 into the method of the back deeply. Since the 1st engaging pin 16 stopped by the return pin locking part 24a moves to the extension way 25 through the 2nd guide rail 23 by this as shown in drawing 15 (a) - (c), if SD card 60 is pushed in as it is, it will shift to the state of drawing 12 through the state of drawing

11. When making SD card 60 which moved from the 2nd fixing point to the 1st fixing point, and was made into the antenna circuit exposure discharge, an operator should just remove an operating physical force, after stuffing SD card 60 into the method of the back shallowly. As were shown in drawing 16 (a) – (c) and the 1st engaging pin 16 stopped by the return pin locking part 24a was the 2nd guide rail 23 by this, when it moves [to], Since the 1st slider 14 and engaging arm 15 will be put back to the front by the elastic force of the 1st coil spring 20, the 1st engaging pin 16 can follow the heart shape cam groove 21 to the lower stream, and SD card 60 can be made to discharge.

[0033]It becomes impossible to pass the 1st fixing point and the 2nd fixing point can also be made to equip with SD card 60 to store inserted SD card 60 immediately. Namely, since the 1st engaging pin 16 moves to the extension way 25 through the 1st guide rail 22 from the heart shape cam groove 21 as shown in the arrow of drawing 17 if inserted SD card 60 is deeply stuffed into the method of the back, If SD card 60 is then pushed in, it will shift to the state of drawing 12 through the state of drawing 11.

[0034]Next, the operation in the case of using SD card 50 of short ** for this connector device for cards is explained with reference to drawing 18. Drawing 18 shows the state where the 1st fixing point was equipped with SD card 50 of short **.

[0035]Since SD card 50 of short ** cannot be inserted up to the 2nd fixing point of the method of the back so that clearly [drawing 18], only the 1st fixing point can be equipped. As mentioned above, as for SD card 50 of short **, and SD card 60 of long **, the width dimension, terminal arrangements of an external connection terminal group, etc. are communalized. Therefore, SD card 60 of drawing 9 and the operation explained using 10, i.e., long **, will be inserted, and operation in the case of making the 1st fixing point equip or making SD card 60 of long ** with which the 1st fixing point is equipped discharge, and completely equivalent operation will be performed. Namely, if the operator pushes in SD card 50 of short ** into the insertion space 8 of the frame 1, The 1st engaging pin 16 moves to the 1st guide rail 22 through the heart shape cam groove 21, and since this engaging pin 16 returns to the heart shape cam groove 21 and is stopped by the pin locking part 21a, it can make the 1st fixing point equip with SD card 50, if pushing operation power is removed. Since the 1st engaging pin 16 stopped by the pin locking part 21a will move to the 2nd guide rail 23 if an operator pushes in SD card 50 shallowly in the state of drawing 18, If pushing operation power is removed, this engaging pin 16 can follow the heart shape cam groove 21 to the lower stream, and can make SD card 50 discharge.

[0036]Thus, it not only can use SD card 50 of short ** for the 1st fixing point, equipping with it, but according to this example of an embodiment, it can use SD card 60 of long ** for the 1st and 2nd fixing points, equipping them with it selectively. And since it can make with a housed state if the 2nd fixing point of the method of the back is equipped with this even if it is SD card 60 of long **, there is no fear of spoiling appearance or interfering with a cellular phone. And the size L1 in which the rear end part of SD card 50 of short ** with which the 1st fixing point was made to equip projects to the front in this example of an embodiment as shown in drawing 18 and drawing 12, Since these 1st and 2nd fixing points are set up so that the size L2 in which the rear end part of SD card 60 of long ** with which the 2nd fixing point was made to equip projects to the front may serve as an abbreviated EQC, exterior communalization can be attained and the design nature at the time of use is not spoiled.

[0037]The 1st discharge maintaining structure 6 that can discharge the SD card with which the 1st fixing point is equipped in this example of an embodiment, Have established the 2nd movable discharge maintaining structure 7 to the front via the header member 3, and the SD card with which the 2nd fixing point is equipped. Since the header member 3 drives an SD card to this SD card, and moves it in one in the process stuffed into the 2nd fixing point and it is made for external connection terminal 61 group to have not overcome terminal strip 4 group therefore, When the amount of elasticity of the 1st coil spring 20 can be controlled, and reinforcement can be attained and the 2nd fixing point is equipped with an SD card, excessive pushing operation power is not needed but good operativity can be expected. Namely, since reciprocation moving of SD card 60 of long ** can be carried out simply and smoothly between the 1st fixing point and the 2nd fixing point, For example, practical usage of making it the housed state which equipped

the 1st fixing point with this SD card 60 to use an antenna circuit by a good sensitivity situation, and equipped the 2nd fixing point with this SD card 60 when other can be performed easily. And while moving SD card 60 of long ** between the 1st fixing point and the 2nd fixing point, Since the electrical link of the external connection terminal 61 group and terminal strip 4 group of the header member 3 does not break off, the operator can move SD card 60 to a desired fixing point at any time according to the receiving condition of an antenna circuit, etc., and is user-friendly.
[0038]Since each terminal strip 4 has soldered FPC5 which is supported by cantilever form at the end of the near side of the header member 3, and is prolonged from the back side of the frame 1 to this side to the fixed end part of each terminal strip 4 in this example of an embodiment, It is easy to attain the miniaturization which stopped the overall depth of the frame 1, and easy to secure sufficient length which guaranteed flexibility also to FPC5.
[0039]
[Effect of the Invention]This invention is carried out with a gestalt which was explained above, and does so an effect which is indicated below.
[0040]Since it is a connector device for cards which can insert the SD card of short ** and can make the 1st fixing point and the 2nd fixing point the 1st fixing point not only being made to equip but equip with the SD card of long **, it excels in flexibility and practical value is also high. For example, when the antenna circuit is formed in the SD card of long **, an operator inserts this SD card deeply at the time of carrying, and stores to the 2nd fixing point, The usage of making this SD card project to the front, and making the 1st fixing point equip with it becomes possible to expose an antenna circuit.
[0041]Contact with the external connection terminal group of the SD card of long ** and the terminal strip group of a header member has been maintained. Since it is not necessary to carry out reciprocation moving of this SD card between the 1st fixing point and the 2nd fixing point and this SD card does not need to overcome a terminal strip group at the time of this movement, this SD card can be smoothly moved between the 1st and 2nd fixing points, with an electrical link with the main frame maintained. For example, since the operator can move the SD card of long ** to a desired fixing point at any time according to the receiving condition of an antenna circuit, etc., user-friendliness becomes good.
[0042]If each terminal strip is supported to cantilever form at the end of the near side of a header member and these terminal strip group is connected with the main frame by FPC, Since an adverse effect stops attaining to the connected state of each terminal strip and the main frame even if soldering of the fixed end part of each terminal strip and FPC is not only easy, but it moves a header member between the 1st holding position and the 2nd holding position by sagging FPC, reliability increases. And since the overall depth of housing can be reduced by carrying out like this, it becomes easy to attain the miniaturization of a connector device.

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention]This invention equips with the card called a sized memory card, an SD card, etc., The connector device for cards connected to the electronic circuit in which the external connection terminal group provided in this card was provided by electronic devices, such as a personal computer, is started, and it is especially related with the connector device for cards corresponding to the formation of long ** of the card accompanying multi-functionalization.

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PRIOR ART

[Description of the Prior Art]The card (an SD card is called hereafter) with which electronic devices, such as a personal computer and an electronic camera, are equipped enabling free attachment and detachment and which can perform writing and reading of information from before is known. As for this kind of card, contour shape is formed in the card shape of an approximately rectangle.
Two or more external connection terminals are installed successively by the end part of one side.
The electronic device which can equip with this SD card is equipped with the circuit board in which the necessary electronic circuit was established, and the connector device for cards for connecting the external connection terminal group of an SD card to this electronic circuit.
[0003]Such a connector device for cards is equipped with the housing which has the insertion space where an SD card is inserted from the open end side, two or more terminal strips which it is fixed to this housing and exposed in insertion space, and the discharge mechanism for discharging the SD card with which it was equipped.
[0004]Housing is usually constituted combining the frame which consists of insulating materials, and covering which consists of a metallic material or an insulating material, and the insertion space for SD cards is formed between a frame and covering. It exposes in insertion space and the external connection terminal of an SD card, the contact portion which can be contacted, and the soldering part soldered to the electronic circuit established in electronic devices, such as a personal computer, are provided in each terminal strip.
When the predetermined fixing point is equipped with the SD card inserted in insertion space, it is designed so that the external connection terminal group may contact the contact portion of each terminal strip.

[0005]The thing of composition of having had the coil spring which engages with an SD card as a discharge mechanism, and carries out elastic energization of the slider in which reciprocation moving is possible, and this slider to a card ejecting direction, and the engaging pin guided to a heart shape cam groove is known. If an operator pushes in with fingers the end (rear end part) of the near side of the SD card with which the predetermined fixing point is equipped by making a slider and an engaging pin collaborate, with a slider, this card moves to the front and can discharge this thing easily.

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EFFECT OF THE INVENTION

[Effect of the Invention]This invention is carried out with a gestalt which was explained above, and does so an effect which is indicated below.
[0040]Since it is a connector device for cards which can insert the SD card of short ** and can make the 1st fixing point and the 2nd fixing point the 1st fixing point not only being made to equip but equip with the SD card of long **, it excels in flexibility and practical value is also high. For example, when the antenna circuit is formed in the SD card of long **, an operator inserts this SD card deeply at the time of carrying, and stores to the 2nd fixing point, The usage of making this SD card project to the front, and making the 1st fixing point equip with it becomes possible to expose an antenna circuit.
[0041]Contact with the external connection terminal group of the SD card of long ** and the terminal strip group of a header member has been maintained. Since it is not necessary to carry out reciprocation moving of this SD card between the 1st fixing point and the 2nd fixing point and this SD card does not need to overcome a terminal strip group at the time of this movement, this SD card can be smoothly moved between the 1st and 2nd fixing points, with an electrical link with the main frame maintained. For example, since the operator can move the SD card of long ** to a desired fixing point at any time according to the receiving condition of an antenna circuit, etc., user-friendliness becomes good.
[0042]If each terminal strip is supported to cantilever form at the end of the near side of a header member and these terminal strip group is connected with the main frame by FPC, Since an adverse effect stops attaining to the connected state of each terminal strip and the main frame even if soldering of the fixed end part of each terminal strip and FPC is not only easy, but it moves a header member between the 1st holding position and the 2nd holding position by sagging FPC, reliability increases. And since the overall depth of housing can be reduced by carrying out like this, it becomes easy to attain the miniaturization of a connector device.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention]By the way, it not only uses an SD card as a mere storage in recent years, but, The requests of using it as communication equipment by providing a transmission and reception circuit etc. are mounting, and in connection with it, compared with the old SD card, although terminal specification is the same, the appearance of the SD card which enlarged the linear dimension is expected. For example, the antenna circuit for short-distance-radio communication is established in the back end side of the SD card of long **, Only when using this antenna circuit, the connector device is equipped with the SD card by the shallow insertion condition, and when not using an antenna circuit, the usage of inserting an SD card in a connector device by a deep insertion condition will fully be considered from now on.
[0007]However, the conventional connector device for cards, Since it does not have structure supposing equipping with the SD card of this long **, even if specified quantity insertion of this SD card can be carried out and it can aim at electric connection, when not using an antenna circuit, for example, it cannot be said that this SD card is inserted deeply and stored. Namely, if you are going to make it apply the conventional connector device for cards to an SD card usually longer than elegance, this SD card must be changed into the state where it was made to project greatly, from the open end of the insertion space of housing to this side, Electronic device bodies, such as a notebook sized personal computer, must be carried, equipping a connector device with this SD card it not only must say that appearance is bad, but, and the problem that it is very user-unfriendly arises.
[0008]This invention is made in order to cancel the defect of this conventional technology, the purpose can make the position of the request from which an insertion amount differs equip with the SD card of long ** selectively, and there is user-friendliness in providing the good connector device for cards.

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MEANS

[Means for Solving the Problem]In order to attain the purpose mentioned above, a connector device for cards by this invention, It has the insertion space where a card (SD card) which provided an external connection terminal group is inserted from the open end side, and said card -- an insertion amount into said insertion space -- smallness -- the 1st fixing point and insertion amount -- size -- selectively to the 2nd fixing point with housing with which it can equip. Have two or more terminal strips which can contact said external connection terminal group, and reciprocation moving is possible between the 1st holding position in said insertion space, and the 2nd holding position, In said 1st holding position, said two or more terminal strips contact said external connection terminal group of said card with which said 1st fixing point was equipped, And a header member to which said two or more terminal strips contact said external connection terminal group of said card with which said 2nd fixing point was equipped in said 2nd holding position, Holding mechanism which has a mechanism in which can hold said header member selectively to said 1st holding position and said 2nd holding position, and this header member is moved to said 1st holding position from said 2nd holding position, When it has a cable which was drawn from the main frame and connected to said terminal strip group of said header member and said 2nd fixing point is made to equip with said card, It constituted so that said header member in said 1st holding position might move to said 2nd holding position.
[0010]Since the connector device constituted in this way can insert an SD card of short ** and can make the 1st fixing point and the 2nd fixing point the 1st fixing point not only being made to equip but equip with an SD card of long **, If expose an antenna circuit built, for example in the SD card when making the 1st fixing point equip with an SD card of long **, and it can be used as communication equipment, and an SD card of long ** is inserted deeply and the 2nd fixing point is made to equip, It can be used as a storage or can hold to a housed state convenient to carry. and an SD card of long ** with which the 1st fixing point is equipped and which is contacting an external connection terminal group in a terminal strip group of a header member -- an operator -- fingers -- a method of the back -- ** -- by pushing in a fixed quantity, A header member driven to this SD card can be moved from the 1st holding position to the 2nd holding position, and can make it hold to holding mechanism, and. Since the 2nd fixing point can be made to equip with this SD card, this SD card can be moved from the 1st fixing point to the 2nd fixing point, with contact with an external connection terminal group and a terminal strip group maintained. In this case, since an SD card does not overcome a terminal strip group and does not necessarily move to the 2nd fixing point, it can push into a method of the back smoothly. When the 2nd fixing point is equipped with an SD card of long **, Since this SD card can be driven by a header member and can be moved to the front by moving a header member to the 1st holding position from the 2nd holding position by maintenance releasing operation of holding mechanism, etc., This SD card can be smoothly moved from the 2nd fixing point to the 1st fixing point, with contact with an external connection terminal group and a terminal strip group maintained.
[0011]In composition which this invention mentioned above, if said cable is a flexible printed circuit board, Since an adverse effect stops attaining to a connected state of each terminal strip and the main frame even if soldering with each terminal strip of a header member is not only easy, but it moves a header member between the 1st holding position and the 2nd holding

position by sagging a flexible printed circuit board, it is desirable. Each terminal strip is supported by end of a near side of a header member at cantilever form in that case, and. If a flexible printed circuit board is prolonged from the back side of housing to this side and is soldered to a fixed end part of each terminal strip, it will become easy to secure sufficient length which it becomes easy to attain a miniaturization which stopped overall depth of housing, and guaranteed flexibility to a flexible printed circuit board.

[0012]A slider which wants to mention this invention above and which shifted and was united with said holding mechanism by said header member in that composition, An engaging pin which moves along a cam groove which has a pin locking part with movement of this slider, An energizing member which turns said slider to an eject direction of an SD card, and carries out elastic energization is provided, If said pin locking part is made to stop said engaging pin, movement of said slider will be prevented and said header member will be held in said 2nd holding position, And if said engaging pin is made to secede from said pin locking part, said slider will be energized by said energizing member and will move to said eject direction, and. If said header member moves to said 1st holding position from said 2nd holding position and is held in this 1st holding position, an operator will push in an SD card with which the 1st fixing point is equipped, By carrying out specified quantity movement of the header member from the 1st holding position to a method of the back, a pin locking part of a cam groove can be made to be able to stop an engaging pin, and this header member can be held to the 2nd holding position. An operator pushes in an SD card with which the 2nd fixing point is equipped, By making an engaging pin secede from a pin locking part via a header member, this header member can be moved from the 2nd holding position to the 1st holding position by elastic force of an energizing member, and it can hold to this 1st holding position. Therefore, operation which makes a header member hold to the 1st holding position and 2nd holding position selectively, or moves it to them among both holding positions can be performed simply and smoothly via an SD card of long **.

[0013]Have an ejecting means which can discharge an SD card with which said 1st fixing point is equipped in this composition, and along an insertion eject direction of an SD card to this ejecting means The 1st slider in which reciprocation moving is possible, The 1st engaging pin that moves along the 1st cam groove with movement of this 1st slider, The 1st energizing member that turns said 1st slider to said eject direction, and carries out elastic energization, It is supported pivotally by said 1st slider, enabling free rotation, and to an SD card An engaging arm which can give power to said eject direction, A rotation control part which regulates rotation to a way outside said engaging arm when an insertion point of an SD card has not arrived at said 1st fixing point, If a rotation allowing part which permits rotation to a way outside said engaging arm in a process which an SD card moves to said 2nd fixing point from said 1st fixing point and to which this engaging arm is evacuated is provided, As an SD card is the 1st fixing point and 2nd fixing point, in order that an engaging arm may evacuate to a rotation allowing part in a stage inserted [to], Retreating a slider of said holding mechanism, an SD card can be further stuffed into a method of the back, and it can be made to reach to the 2nd fixing point, without retreating the 1st slider more. Therefore, if the 1st energizing member is a coil spring, for example, the amount of elasticity can be controlled and reinforcement can be attained.

[0014]An SD card which is two kinds which want to mention this invention above, and from which it shifts and the length of an insertion eject direction differs in that composition is received, A size in which this card projects from said open end to a method of outside when said 1st fixing point is equipped with one short ** card, If said 1st and 2nd fixing points are set up so that a size in which this card projects from said open end to a method of outside may serve as an abbreviated EQC, when said 2nd fixing point is equipped with a long ** card of another side, since exterior communalization can be attained, design nature at the time of use will improve.

[0015]

[Embodiment of the Invention]The top view which drawing 1 omits covering of the connector device for cards concerning the example of an embodiment, and is shown when an embodiment of the invention is described with reference to drawings, The top view of the housing of this connector device and drawing 3 drawing 2 The top view of the header member of this connector device, The flexible printed circuit board by which drawing 4 is connected to this header member.

The top view of (calling FPC hereafter), the top view of a header member in which drawing 5 soldered this FPC, The header member which shows drawing 5 drawing 6 and the sectional view of FPC, the explanatory view of the cam groove where drawing 7 was provided in the 1st discharge maintaining structure of this connector device, and drawing 8 are the explanatory views of the cam groove established in the 2nd discharge maintaining structure of this connector device.

[0016]The connector device for cards shown in these figures is for being attached to electronic devices, such as a personal computer, and equipping with an SD card, and can be connected to the electronic circuit in which the external connection terminal group of the SD card with which the prescribed position was equipped was provided by the electronic device body. And this connector device for cards not only can equip with the SD card of short **, but is constituted so that it can equip also with the SD card of long **.

[0017]When concrete composition is described, this connector device for cards, The housing which combines covering which consists of the frame 1 which consists of insulating materials, and a metallic material, and which is not illustrated, Have an external connection terminal group of an SD card, and two or more terminal strips 4 which can be contacted, and The header member 3 in which reciprocation moving is possible within the frame 1, Outline composition is carried out by FPC5 which was drawn from the electronic device body and soldered to terminal strip 4 group of the header member 3, the 1st discharge maintaining structure 6 provided in the one side part of the frame 1, and the 2nd discharge maintaining structure 7 provided in the other side portion of the frame 1.

[0018]Between the frame 1 of said housing, and covering, the insertion space 8 where an SD card is inserted from the open end 8a side is formed. As shown in drawing 2, the cam groove 9, the regulation wall 10, and the notch 11 which make a part of 1st discharge maintaining structure 6 are formed in the one side part of the frame 1, and the heart shape cam groove 12 which makes a part of 2nd discharge maintaining structure 7 is formed in the other side portion of the frame 1.

[0019]As shown in drawing 3, the header member 3 comes to fix two or more terminal strips 4 to cantilever form at the base body 30 made of a synthetic resin which has the window hole 30a and the press wall 30b, and fixes terminal strip 4 group to the base body 30 by insert molding in this example of an embodiment, but. Heat may attach terminal strip 4 group with a bundle etc. after shaping of the base body 30. This header member 3 can be selectively held according to the 2nd discharge maintaining structure 7 to the 1st holding position of the open end 8a slippage in the insertion space 8, and the 2nd holding position of back slippage, and reciprocation moving is possible for it among these both holding positions. As shown in drawing 6, the contact portion 4a currently formed in the free end section of each terminal strip 4 has pushed out between base body 30 absentminded from the window hole 30a, And since the relative position relation of each contact portion 4a is set up on a par with the relative position relation (terminal arrangements) of each external connection terminal of an SD card, each contact portion 4a can be made to contact elastically each external connection terminal of the SD card inserted into the insertion space 8. Since each land 5a of FPC5 shown in drawing 4 is soldered to the fixed end part of each terminal strip 4 currently supported by the end of the near side (open end 8a side) of the header member 3, Even if it carries out the moved back of the header member 3 within the frame 1, it bends, as shown to drawing 6 in FPC5, and the electric connection between each terminal strip 4 and an electronic device body is maintained.

[0020]the 1st discharge maintaining structure 6 -- an SD card -- an insertion amount -- smallness -- the 1st fixing point and insertion amount -- size -- it is a mechanism for making the 2nd fixing point equip selectively, or making the SD card with which the 1st fixing point is equipped discharge. And the external connection terminal group can be contacted to the contact portion 4a of each terminal strip 4 of the header member 3 currently held in said 1st holding position by inserting an SD card to near the center section in the insertion space 8, and making the 1st fixing point equip. The external connection terminal group can be contacted to the contact portion 4a of each terminal strip 4 of the header member 3 currently held in said 2nd holding position by inserting an SD card to the inner in the insertion space 8, and making the 2nd

fixing point equip.
[0021]If the composition of the 1st discharge maintaining structure 6 is explained in detail, this 1st discharge maintaining structure 6 will be provided with the following.
The insertion eject direction of an SD card is met and it is the 1st slider 14 in which reciprocation moving is possible.
The engaging arm 15 which is supported pivotally by this slider 14 enabling free rotation and for which an SD card engages [a front tip part and].
The 1st engaging pin 16 that moves along said cam groove 9 with movement of the 1st slider 14.
The pressure plate 17 currently pressed down so that this engaging pin 16 may not be omitted from the cam groove 9, The 1st elastic piece 18 that could engage with the crevice established in one side edge of an SD card, and was held at the 1st slider 14, The 2nd elastic piece 19 that could engage with this crevice of the SD card and was held at the engaging arm 15, and the 1st coil spring 20 that turns the 1st slider 14 to a card ejecting direction, and carries out elastic energization.
Said regulation wall 10 and the notch 11 of the frame 1 are also a component of the 1st discharge maintaining structure 6, and the regulation wall 10 regulates the rotation to a way outside the engaging arm 15, when the insertion point of an SD card has not arrived at the 1st fixing point. On the other hand, the notch 11 permits the rotation to a way outside the engaging arm 15, as an SD card moves to the 2nd fixing point from the 1st fixing point, and it evacuates this engaging arm 15.
[0022]The heart shape cam groove 21 which has the pin locking part 21a for stopping the 1st engaging pin 16 and holding an SD card to the 1st fixing point in the cam groove 9 as shown in drawing 7, The 1st guide rail 22 that is open for free passage to the heart shape cam groove 21 by the upstream of the pin locking part 21a, and extends to the method of the back, The 2nd guide rail 23 that is open for free passage to the heart shape cam groove 21 by the downstream of the pin locking part 21a, and extends to the method of the back, The feedback loop 24 which guides the course of the 1st engaging pin 16 in the process which an SD card moves to the 1st fixing point from the 2nd fixing point, The extension way 25 which is open for free passage to both the guide rails 21 and 22 and the feedback loop 24, and extends to the method of the back is formed, and the 2nd guide rail 23 has been an advance course which makes an SD card movable from the 1st fixing point to the 2nd fixing point. In the feedback loop 24, the return pin locking part 24a for stopping the 1st engaging pin 16 while moving this feedback loop 24, and holding an SD card to the 1st fixing point is formed, and this feedback loop 24 makes the 2nd guide rail 23 open for free passage by the downstream of the return pin locking part 24a. And since movement of the 1st slider 14 is prevented when the 1st engaging pin 16 is stopped by the pin locking part 21a or the return pin locking part 24a, the SD card which is engaging with this slider 14 via the 1st elastic piece 18 is held in the 1st fixing point.
[0023]On the other hand, the 2nd discharge maintaining structure 7 is a mechanism for holding the header member 3 selectively to the 1st holding position and 2nd holding position, or moving the header member 3 currently held in the 2nd holding position to the 1st holding position. This 2nd discharge maintaining structure 7 is provided with the following.
It is fabricated in one with the base body 30 of the header member 3, the insertion eject direction of an SD card is met, and it is the 2nd slider 26 in which reciprocation moving is possible.
The 2nd engaging pin 27 that moves along said heart shape cam groove 12 with movement of this slider 26.
The pressure plate 28 currently pressed down so that this engaging pin 27 may not be omitted from the heart shape cam groove 12.
The 2nd coil spring 29 that turns the 2nd slider 26 to the eject direction of an SD card, and carries out elastic energization.
As shown in drawing 8, when the pin locking part 12a is formed in the heart shape cam groove 12 and an SD card is in the 2nd fixing point, the 2nd engaging pin 27 is stopped by this pin locking part 12a, and prevents movement of the 2nd slider 26. At this time, the 2nd elastic piece 19 held at said engaging arm 15 engages with the crevice of an SD card, and an SD card can be held

now to the 2nd fixing point.
[0024]Next, operation of the connector device for cards constituted in this way is explained with reference to drawing 9 - drawing 18. First, the operation in the case of using SD card 60 longer than SD card 50 of short ** adopted widely now is explained using drawing 9 - drawing 17.
[0025]External connection terminal 61 group which can contact the contact portion 4a of each terminal strip 4 of the header member 3 is provided in the path-of-insertion front end side of SD card 60 of long **. The crevice 62 in which the elastic pieces 18 and 19 of the 1st discharge maintaining structure 6 and engagement are possible is established in one side edge of this SD card 60. As for SD card 60 of this long **, all of the width dimension, the terminal arrangements of external connection terminal 61 group, the distance from a front tip to the crevice 62, etc. are designed on a par with SD card 50 of short **. However, the antenna circuit which is not illustrated is established in the path-of-insertion back end side of SD card 60 of long **, and to use this antenna circuit by the best possible sensitivity situation, it is necessary to equip a connector device with a rear end portion in the state where it was made to expose to the front.
[0026]Drawing 9 is a top view immediately after starting insertion of SD card 60 of long ** to the connector device for cards concerning this example of an embodiment, and in this state, since the header member 3 is forced near the open end 8a of the frame 1 according to the elastic force of the 2nd coil spring 29, it is held in the 1st holding position. If SD card 60 is inserted to the position shown in drawing 9, the 1st elastic piece 18 will engage with the crevice 62, and the engaging arm 15 will contact the front tip part of SD card 60. Therefore, when the operator inserts SD card 60 further, the engaging arm 15 by which the rotation to the method of outside is regulated with the regulation wall 10 of the frame 1 will be stuffed into SD card 60, The 1st slider 14 and engaging arm 15 move to the method of the back following SD card 60, and the 1st engaging pin 16 moves along the heart shape cam groove 21 with movement of this slider 14.
[0027]And since the 1st engaging pin 16 will move to the 1st guide rail 22 from the heart shape cam groove 21 as an arrow shows to drawing 10 if SD card 60 is pushed in to the certain quantity back rather than the 1st fixing point, If pushing operation power is removed, the 1st slider 14 and engaging arm 15 are put back to the front by the elastic force of the 1st coil spring 20, and the pin locking part 21a can be made to stop the 1st engaging pin 16. Where external connection terminal 61 group is contacted to the contact portion 4a of each terminal strip 4 of the header member 3 currently held in the 1st holding position by this, SD card 60 will be held in the 1st fixing point, and it becomes possible to use the antenna circuit exposed to the front by a good sensitivity situation.
[0028]What is necessary is to stuff SD card 60 of the state of drawing 10 into the method of the back shallowly, and just to make the 1st engaging pin 16 secede from the pin locking part 21a, when discharging SD card 60 with which the 1st fixing point was equipped in this way. Since the 1st engaging pin 16 moves the inside of the heart shape cam groove 21 to the lower stream by this at drawing 9 as an arrow shows, SD card 60 is put back to a discharge position by the 1st slider 14 and engaging arm 15 that move to the front by the elastic force of the 1st coil spring 20. That is, the operator can make SD card 60 currently held in the 1st fixing point discharge by easy operation of a one push.
[0029]In order to expose an antenna circuit, in making it move to the 2nd fixing point and making into a housed state SD card 60 currently held to the 1st fixing point, the operator stuffs SD card 60 of the state of drawing 10 into the method of the back. Then, with movement of the 1st slider 14, the 1st engaging pin 16 moves to the extension way 25 through the 2nd guide rail 23 from the heart shape cam groove 21, as shown in drawing 11 at an arrow. Since it rotates to the method of outside and evacuates into the notch 11 of the frame 1 while the engaging arm 15 is pushed on SD card 60 when SD card 60 is inserted to the position of drawing 11, movement to the method of the back of the engaging arm 15 is regulated. Therefore, even if SD card 60 is further stuffed into the method of the back, the 1st slider 14 has stopped and the 1st elastic piece 18 secedes from the crevice 62 of SD card 60. However, since the front tip part will push in the press wall 30b of the base body 30 if SD card 60 is stuffed into the method of the back from the 1st fixing point, The header member 3 and the 2nd slider 26 move to the method of the back following movement to the method of the back of SD card 60, and the 2nd engaging pin 27

moves along the heart shape cam groove 12 in connection with it. Since both 3 and 60 will move in one if the header member 3 is stuffed into SD card 60 in this way, contact with the contact portion 4a of each terminal strip 4 and external connection terminal 61 group does not break off.
[0030]And since the 2nd engaging pin 27 moves the inside of the heart shape cam groove 12 to drawing 12 by pushing in SD card 60 to the certain quantity back rather than the 2nd fixing point as an arrow shows, If pushing operation power is removed, the header member 3 and the 2nd slider 26 will be put back to the front by the elastic force of the 2nd coil spring 29, the pin locking part 12a can be made to stop the 2nd engaging pin 27, and the header member 3 will be held by this in the 2nd holding position. The 2nd elastic piece 19 is entering and engaging with the crevice 62 of SD card 60 in this state. That is, where external connection terminal 61 group is contacted to the contact portion 4a of each terminal strip 4 of the header member 3 currently held in the 2nd holding position, SD card 60 will be held in the 2nd fixing point. Although SD card 60 can be made by making the 2nd fixing point equip in this way with the housed state which does not project greatly to the front, if a receiving condition avoids, an antenna circuit can also be used with this housed state.
[0031]What is necessary is just to stuff SD card 60 of the state of drawing 12 into the method of the back shallowly, in moving SD card 60 of the housed state currently held to the 2nd fixing point to the 1st fixing point. Since the 2nd engaging pin 27 secedes from the pin locking part 12a, and it moves the inside of the heart shape cam groove 12 to the lower stream by this at drawing 13 as an arrow shows, The header member 3 and the 2nd slider 26 move to the front by the elastic force of the 2nd coil spring 29, and therefore, SD card 60 is energized by the press wall 30b, and moves to the front. As a result, since the engaging arm 15 evacuated to the notch 11 rotates to an inner direction and the 1st slider 14 moves to the front, As shown in drawing 14 (a), the 1st engaging pin 16 moves to the feedback loop 24 from the extension way 25, as further shown in drawing 14 (b), the 1st engaging pin 16 is stopped by the return pin locking part 24a of the feedback loop 24, and SD card 60 is put back to the 1st fixing point. In this state, to the 1st holding position, the header member 3 returns and is held. That is, the operator can set it as the state where moved SD card 60 currently held in the 2nd fixing point to the 1st fixing point by easy operation of the one push, and the antenna circuit was exposed. In and the process in which SD card 60 is moved to the 1st fixing point from the 2nd fixing point. Since contact with external connection terminal 61 group and the contact portion 4a of each terminal strip 4 does not break off, for example, while using the antenna circuit by the housed state, when sensitivity falls, an antenna circuit can be exposed only by operation of a one push to SD card 60, sensitivity can be raised in an instant, and user-friendliness is markedly alike and becomes good. The courses which the 1st engaging pin 16 passes differ by the case where SD card 60 moves to the 2nd fixing point from the 1st fixing point, and the case where it moves to the 1st fixing point from the 2nd fixing point conversely so that clearly, if drawing 10 - drawing 14 are seen.
[0032]In this way, when moving SD card 60 to the 2nd fixing point again after changing into the state where moved SD card 60 from the 2nd fixing point to the 1st fixing point, and the antenna circuit was exposed, the operator should just stuff SD card 60 into the method of the back deeply. Since the 1st engaging pin 16 stopped by the return pin locking part 24a moves to the extension way 25 through the 2nd guide rail 23 by this as shown in drawing 15 (a) - (c), if SD card 60 is pushed in as it is, it will shift to the state of drawing 12 through the state of drawing 11. When making SD card 60 which moved from the 2nd fixing point to the 1st fixing point, and was made into the antenna circuit exposure discharge, an operator should just remove an operating physical force, after stuffing SD card 60 into the method of the back shallowly. As were shown in drawing 16 (a) - (c) and the 1st engaging pin 16 stopped by the return pin locking part 24a was the 2nd guide rail 23 by this, when it moves [to], Since the 1st slider 14 and engaging arm 15 will be put back to the front by the elastic force of the 1st coil spring 20, the 1st engaging pin 16 can follow the heart shape cam groove 21 to the lower stream, and SD card 60 can be made to discharge.
[0033]It becomes impossible to pass the 1st fixing point and the 2nd fixing point can also be made to equip with SD card 60 to store inserted SD card 60 immediately. Namely, since the 1st engaging pin 16 moves to the extension way 25 through the 1st guide rail 22 from the heart

shape cam groove 21 as shown in the arrow of drawing 17 if inserted SD card 60 is deeply stuffed into the method of the back, If SD card 60 is then pushed in, it will shift to the state of drawing 12 through the state of drawing 11.
[0034]Next, the operation in the case of using SD card 50 of short ** for this connector device for cards is explained with reference to drawing 18. Drawing 18 shows the state where the 1st fixing point was equipped with SD card 50 of short **.
[0035]Since SD card 50 of short ** cannot be inserted up to the 2nd fixing point of the method of the back so that clearly [drawing 18], only the 1st fixing point can be equipped. As mentioned above, as for SD card 50 of short **, and SD card 60 of long **, the width dimension, terminal arrangements of an external connection terminal group, etc. are communalized. Therefore, SD card 60 of drawing 9 and the operation explained using 10, i.e., long **, will be inserted, and operation in the case of making the 1st fixing point equip or making SD card 60 of long ** with which the 1st fixing point is equipped discharge, and completely equivalent operation will be performed. Namely, if the operator pushes in SD card 50 of short ** into the insertion space 8 of the frame 1, The 1st engaging pin 16 moves to the 1st guide rail 22 through the heart shape cam groove 21, and since this engaging pin 16 returns to the heart shape cam groove 21 and is stopped by the pin locking part 21a, it can make the 1st fixing point equip with SD card 50, if pushing operation power is removed. Since the 1st engaging pin 16 stopped by the pin locking part 21a will move to the 2nd guide rail 23 if an operator pushes in SD card 50 shallowly in the state of drawing 18, If pushing operation power is removed, this engaging pin 16 can follow the heart shape cam groove 21 to the lower stream, and can make SD card 50 discharge.
[0036]Thus, it not only can use SD card 50 of short ** for the 1st fixing point, equipping with it, but according to this example of an embodiment, it can use SD card 60 of long ** for the 1st and 2nd fixing points, equipping them with it selectively. And since it can make with a housed state if the 2nd fixing point of the method of the back is equipped with this even if it is SD card 60 of long **, there is no fear of spoiling appearance or interfering with a cellular phone. And the size L1 in which the rear end part of SD card 50 of short ** with which the 1st fixing point was made to equip projects to the front in this example of an embodiment as shown in drawing 18 and drawing 12, Since these 1st and 2nd fixing points are set up so that the size L2 in which the rear end part of SD card 60 of long ** with which the 2nd fixing point was made to equip projects to the front may serve as an abbreviated EQC, exterior communalization can be attained and the design nature at the time of use is not spoiled.
[0037]The 1st discharge maintaining structure 6 that can discharge the SD card with which the 1st fixing point is equipped in this example of an embodiment, Have established the 2nd movable discharge maintaining structure 7 to the front via the header member 3, and the SD card with which the 2nd fixing point is equipped. Since the header member 3 drives an SD card to this SD card, and moves it in one in the process stuffed into the 2nd fixing point and it is made for external connection terminal 61 group to have not overcome terminal strip 4 group therefore, When the amount of elasticity of the 1st coil spring 20 can be controlled, and reinforcement can be attained and the 2nd fixing point is equipped with an SD card, excessive pushing operation power is not needed but good operativity can be expected. Namely, since reciprocation moving of SD card 60 of long ** can be carried out simply and smoothly between the 1st fixing point and the 2nd fixing point, For example, practical usage of making it the housed state which equipped the 1st fixing point with this SD card 60 to use an antenna circuit by a good sensitivity situation, and equipped the 2nd fixing point with this SD card 60 when other can be performed easily. And while moving SD card 60 of long ** between the 1st fixing point and the 2nd fixing point, Since the electrical link of the external connection terminal 61 group and terminal strip 4 group of the header member 3 does not break off, the operator can move SD card 60 to a desired fixing point at any time according to the receiving condition of an antenna circuit, etc., and is user-friendly.
[0038]Since each terminal strip 4 has soldered FPC5 which is supported by cantilever form at the end of the near side of the header member 3, and is prolonged from the back side of the frame 1 to this side to the fixed end part of each terminal strip 4 in this example of an embodiment, It is easy to attain the miniaturization which stopped the overall depth of the frame 1, and easy to secure sufficient length which guaranteed flexibility also to FPC5.

[Translation done.]

* NOTICES *

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2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1]It is a top view showing the connector device for cards concerning the example of an embodiment of this invention.
[Drawing 2]It is a top view of the housing of this connector device.
[Drawing 3]It is a top view of the header member of this connector device.
[Drawing 4]It is a top view of FPC connected to this header member.
[Drawing 5]It is a top view of the header member which soldered this FPC.
[Drawing 6]It is the header member and the sectional view of FPC which are shown in drawing 5.

[Drawing 7]It is an explanatory view of the cam groove established in the 1st discharge maintaining structure of this connector device.
[Drawing 8]It is an explanatory view of the cam groove established in the 2nd discharge maintaining structure of this connector device.
[Drawing 9]It is an explanatory view of this connector device with which the SD card of long ** is inserted of operation.
[Drawing 10]It is an explanatory view of this connector device with which the SD card of long ** is inserted of operation.
[Drawing 11]It is an explanatory view of this connector device with which the SD card of long ** is inserted of operation.
[Drawing 12]It is an explanatory view of this connector device with which the SD card of long ** is inserted of operation.
[Drawing 13]It is an explanatory view of this connector device with which the SD card of long ** is inserted of operation.
[Drawing 14]It is an explanatory view of this connector device with which the SD card of long ** is inserted of operation.
[Drawing 15]It is an explanatory view of this connector device with which the SD card of long ** is inserted of operation.
[Drawing 16]It is an explanatory view of this connector device with which the SD card of long ** is inserted of operation.
[Drawing 17]It is an explanatory view of this connector device with which the SD card of long ** is inserted of operation.
[Drawing 18]It is an explanatory view of this connector device with which the SD card of short ** is inserted of operation.
[Description of Notations]
1 Frame (housing)
2a Soldering part
3 Header member
4 Terminal strip
4a Contact portion
6 1st discharge maintaining structure (ejecting means)
7 2nd discharge maintaining structure (holding mechanism)

8 Insertion space
8a Open end
9 Cam groove
10 Regulation wall (rotation control part)
11 Notch (rotation allowing part)
12 Heart shape cam groove
14 The 1st slider
15 Engaging arm
16 The 1st engaging pin
20 The 1st coil spring
21 Heart shape cam groove
21a Pin locking part
22 The 1st guide rail
23 The 2nd guide rail
24 Feedback loop
24a Return pin locking part
25 Extension way
26 The 2nd slider
27 The 2nd engaging pin
29 The 2nd coil spring
30 Base body
30a Window hole
30b Press wall
50 The SD card of short **
60 The SD card of long **
61 External connection terminal

[Translation done.]

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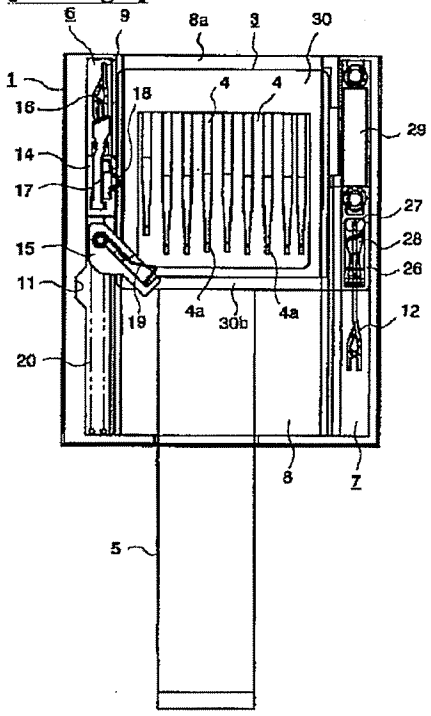
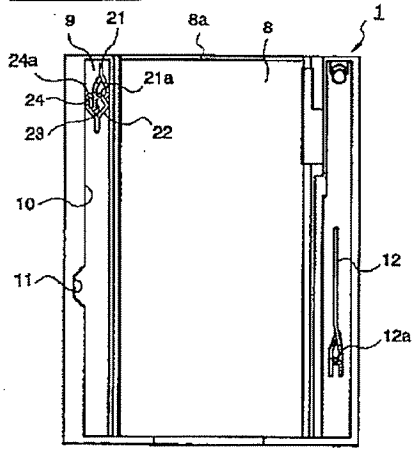
3.In the drawings, any words are not translated.

DRAWINGS

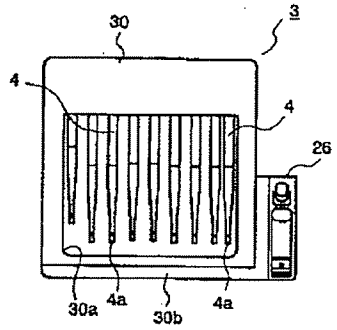
[Drawing 1]



[Drawing 2]



[Drawing 3]



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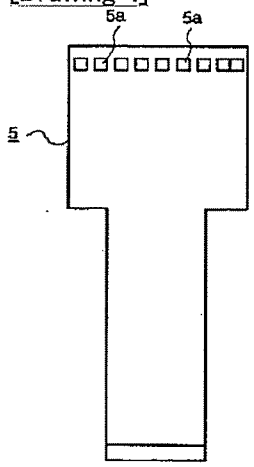

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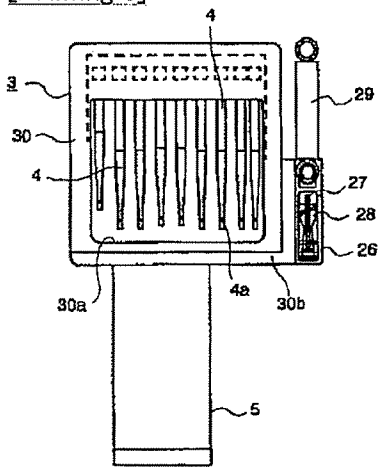

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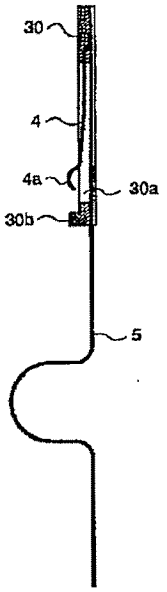

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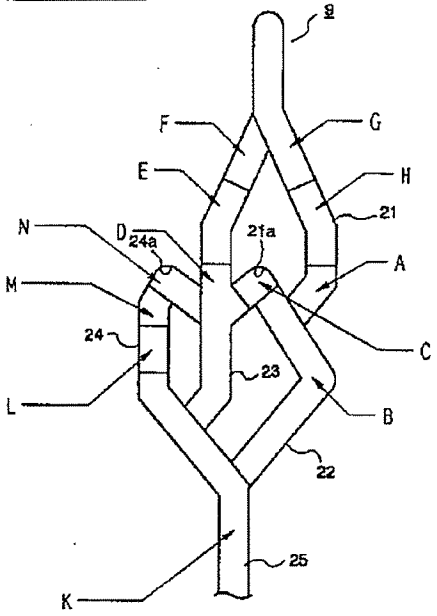

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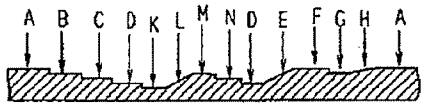

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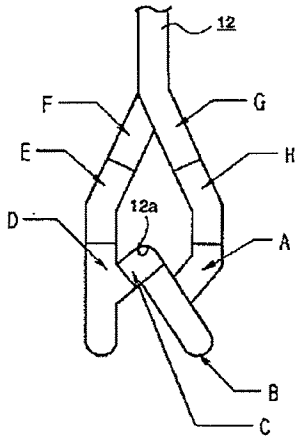

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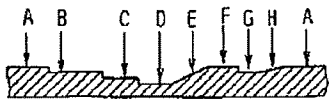
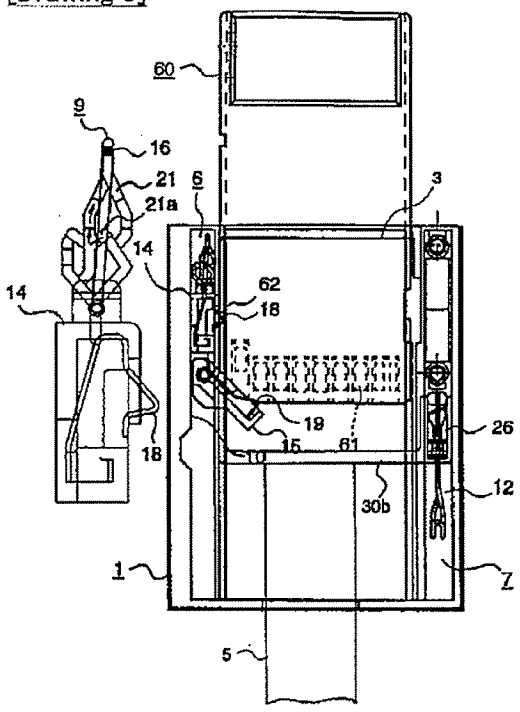
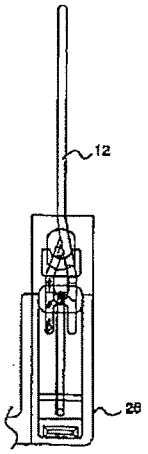


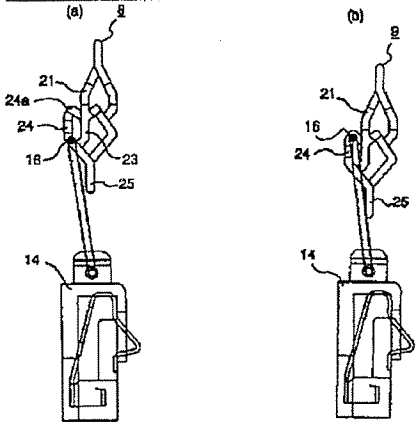
[Drawing 9]



[Drawing 13]



[Drawing 14]



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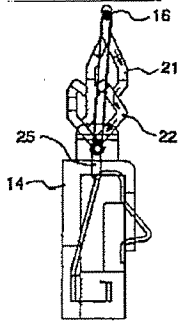
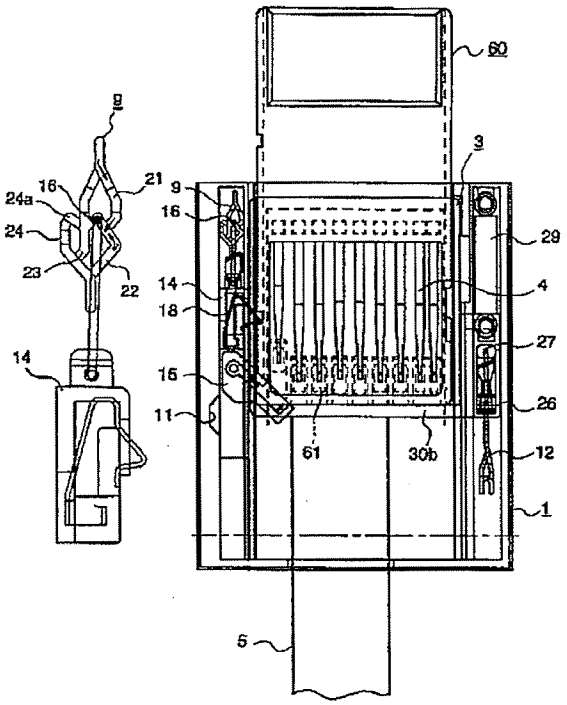


[Drawing 10]



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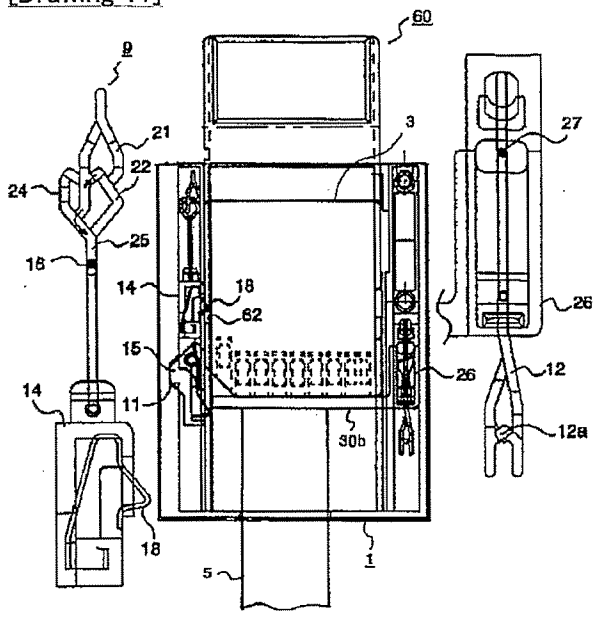
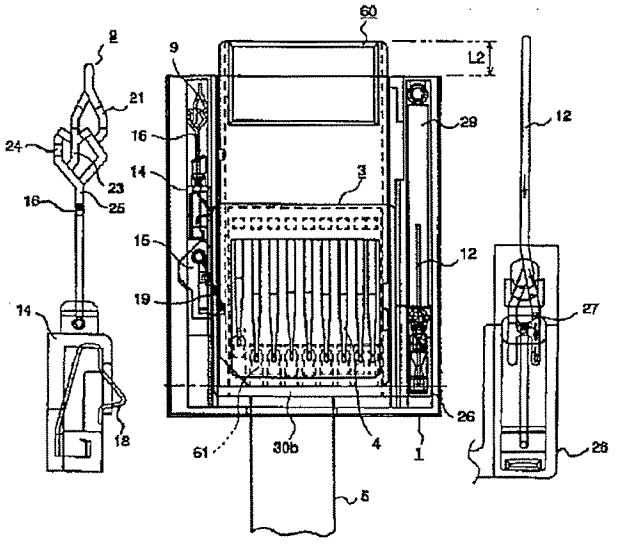
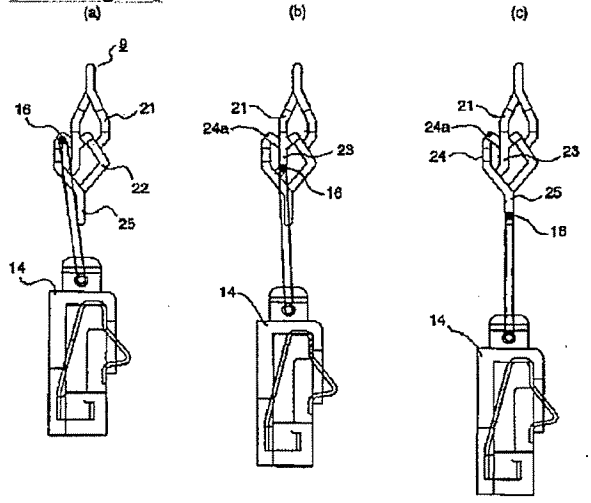


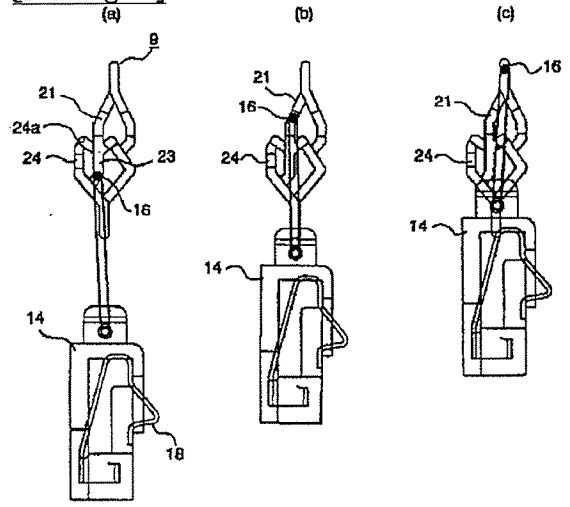
[Drawing 12]



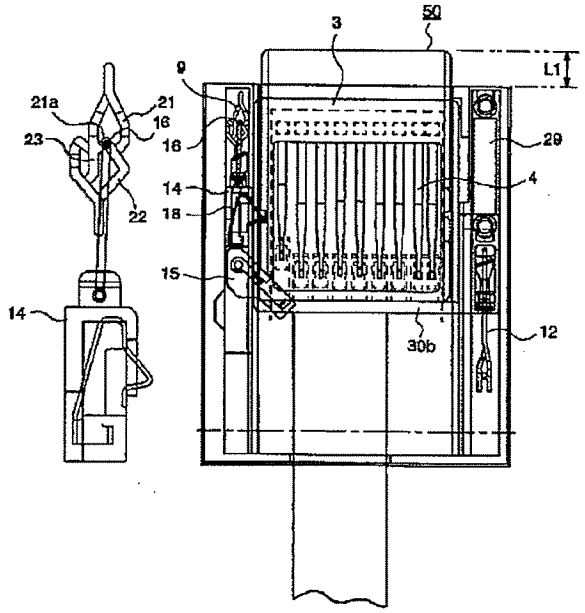
[Drawing 15]



[Drawing 16]



[Drawing 18]



[Translation done.]

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（P2003－31285A）
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(51)Int.Cl.[7]	識別記号	ＦＩ		テーマコード（参考）
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Ｇ０６Ｋ　17/00		Ｈ０１Ｒ　13/629		５Ｅ０２１
Ｈ０１Ｒ　12/22		Ｈ０５Ｋ　7/14	Ｎ	５Ｅ０２３
13/629		Ｈ０１Ｒ　23/68	３０１Ｊ	５Ｅ３４８
Ｈ０５Ｋ　7/14			３０２Ｚ	

審査請求　未請求　請求項の数６　ＯＬ　（全 12 頁）

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(71)出願人　000010098
アルプス電気株式会社
東京都大田区雪谷大塚町１番７号
(72)発明者　黒田　嘉成
東京都大田区雪谷大塚町１番７号　アルプス電気株式会社内
(74)代理人　100078134
弁理士　武　顕次郎　（外３名）

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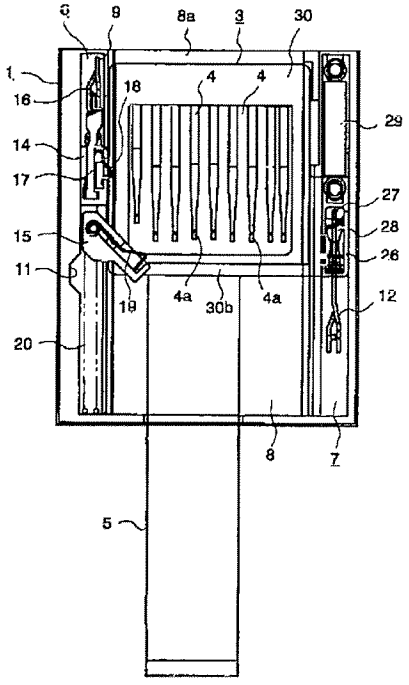
(54)【発明の名称】　カード用コネクタ装置

(57)【要約】　（修正有）
【課題】　長寸のＳＤカードを挿入量の異なる所望の位置に選択的に装着させることができ、使い勝手が良好なカード用コネクタ装置を提供すること。
【解決手段】　ＳＤカードの外部接続端子群に接触可能な複数の端子片４を有して、開口端８ａ寄りの第１の保持位置と奥寄りの第２の保持位置との間で往復移動可能なヘッダ部材３と、このヘッダ部材３を第１の保持位置と第２の保持位置とに選択的に保持可能な保持手段７と、本体装置から導出されてヘッダ部材３の各端子片４に接続されたＦＰＣ５とを備え、長寸のＳＤカードを収納状態となる第２の装着位置へ押し込む際に、第１の保持位置にあるヘッダ部材３が該ＳＤカードに駆動されて第２の保持位置まで移動するようにした。



【特許請求の範囲】
【請求項１】　外部接続端子群を設けたカードが開口端側から挿入される挿入空間を有し、かつ前記カードを前記挿入空間内への挿入量が小なる第１の装着位置と挿入量が大なる第２の装着位置とに選択的に装着可能なハウジングと、
前記外部接続端子群に接触可能な複数の端子片を有して前記挿入空間内の第１の保持位置と第２の保持位置との間で往復移動可能であり、前記第１の保持位置では前記複数の端子片が前記第１の装着位置に装着された前記カードの前記外部接続端子群に接触し、かつ前記第２の保持位置では前記複数の端子片が前記第２の装着位置に装着された前記カードの前記外部接続端子群に接触するヘッダ部材と、
前記ヘッダ部材を前記第１の保持位置と前記第２の保持位置とに選択的に保持可能であり、かつ該ヘッダ部材を前記第２の保持位置から前記第１の保持位置へと移動させる機構を有する保持手段と、
本体装置から導出されて前記ヘッダ部材の前記端子片群に接続されたケーブルとを備え、
前記カードを前記第２の装着位置に装着させる際に、前記第１の保持位置にある前記ヘッダ部材が前記第２の保持位置まで移動するように構成したことを特徴とするカード用コネクタ装置。
【請求項２】　請求項１の記載において、前記ケーブルがフレキシブルプリント基板からなることを特徴とするカード用コネクタ装置。
【請求項３】　請求項２の記載において、前記各端子片が前記ヘッダ部材の手前側の端部に片持ち梁状に支持されていると共に、前記フレキシブルプリント基板が前記ハウジングの奥側から手前へ延びて前記各端子片の固定端部に半田付けされていることを特徴とするカード用コネクタ装置。
【請求項４】　請求項１～３のいずれかの記載において、前記保持手段に、前記ヘッダ部材に一体化されたスライダと、このスライダの移動に伴いピン係止部を有するカム溝に沿って移動する係合ピンと、前記スライダを前記カードの排出方向へ向けて弾性付勢する付勢部材とを設け、前記係合ピンを前記ピン係止部に係止させると前記スライダの移動が阻止されて前記ヘッダ部材が前記第２の保持位置に保持され、かつ、前記係合ピンを前記ピン係止部から離脱させると前記スライダが前記付勢部材に付勢されて前記排出方向へ移動すると共に、前記ヘッダ部材が前記第２の保持位置から前記第１の保持位置へと移動して該第１の保持位置に保持されるように構成したことを特徴とするカード用コネクタ装置。
【請求項５】　請求項４の記載において、前記第１の装着位置に装着されている前記カードを排出可能な排出手段を備え、この排出手段に、前記カードの挿入排出方向に沿って往復移動可能な第１のスライダと、この第１のスライダの移動に伴い第１のカム溝に沿って移動する第１の係合ピンと、前記第１のスライダを前記排出方向へ向けて弾性付勢する第１の付勢部材と、前記第１のスライダに回動自在に軸支されて前記カードに対し前記排出方向への力を付与可能な係合アームと、前記カードの挿入位置が前記第１の装着位置に到達していない場合に前記係合アームの外方への回転を規制する回転規制部と、前記カードが前記第１の装着位置から前記第２の装着位置へ移動する過程で前記係合アームの外方への回転を許容して該係合アームを退避させる回転許容部とを設けたことを特徴とするカード用コネクタ装置。
【請求項６】　請求項１～５のいずれかの記載において、挿入排出方向の長さが異なる２種類の前記カードに対して、一方の短寸カードを前記第１の装着位置に装着したときに該カードが前記開口端から外方へ突出する寸法と、他方の長寸カードを前記第２の装着位置に装着したときに該カードが前記開口端から外方へ突出する寸法とが略同等になるように、前記第１および第２の装着位置を設定したことを特徴とするカード用コネクタ装置。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】本発明は、小型メモリカードやＳＤカードなどと呼称されるカードを装着して、このカードに設けられた外部接続端子群をパソコン等の電子装置に設けられた電子回路に接続させるカード用コネクタ装置に係り、特に、多機能化に伴うカードの長寸化に対応したカード用コネクタ装置に関する。
【０００２】
【従来の技術】従来より、パソコンや電子カメラ等の電子装置に着脱自在に装着されて情報の書き込みや読み取りが行えるカード（以下、ＳＤカードと称する）が知られている。この種のカードは、外形形状が略方形のカード状に形成されており、片面の一端部に複数の外部接続端子が列設されている。また、かかるＳＤカードを装着可能な電子装置には、所要の電子回路が設けられた回路基板と、ＳＤカードの外部接続端子群を該電子回路に接続するためのカード用コネクタ装置とが備えられている。
【０００３】このようなカード用コネクタ装置には、ＳＤカードが開口端側から挿入される挿入空間を有するハウジングと、このハウジングに固定されて挿入空間内に露出する複数の端子片と、装着されたＳＤカードを排出するための排出機構とが備えられている。
【０００４】ハウジングは通常、絶縁材料からなるフレームと、金属材料または絶縁材料からなるカバーとを組み合わせて構成され、フレームとカバーとの間にＳＤカード用の挿入空間が形成される。各端子片には、挿入空間内に露出してＳＤカードの外部接続端子と接触可能な接触部と、パソコン等の電子装置に設けられた電子回路に半田付けされる半田付け部とが設けられており、挿入

空間に挿入されたＳＤカードが所定の装着位置に装着されているとき、その外部接続端子群が各端子片の接触部と接触するように設計されている。

【０００５】排出機構としては例えば、ＳＤカードに係合して往復移動可能なスライダと、このスライダをカード排出方向へ弾性付勢するコイルばねと、ハート型カム溝にガイドされる係合ピンとを備えた構成のものが知られている。このものは、スライダと係合ピンとを協働させることにより、所定の装着位置に装着されているＳＤカードの手前側の端部（後端部）を操作者が手指で押し込むと、該カードがスライダと共に手前へ移動して容易に排出できるようになっている。

【０００６】

【発明が解決しようとする課題】ところで、近年、ＳＤカードを単なる記憶媒体として使用するだけでなく、送受信回路等を設けることにより通信機器として使用するという要望が高まっており、それに伴い、これまでのＳＤカードに比べて、端子仕様は同じであるが長さ寸法を大きくしたＳＤカードの登場が予想されている。例えば、長寸のＳＤカードの後端側に近距離無線通信用のアンテナ回路を設け、このアンテナ回路を使用するときだけＳＤカードを浅い挿入状態でコネクタ装置に装着しておき、アンテナ回路を使用しないときには、ＳＤカードを深い挿入状態でコネクタ装置に差し込んでおくという使われ方が今後十分に考えられる。

【０００７】しかしながら、従来のカード用コネクタ装置は、かかる長寸のＳＤカードを装着することを想定した構造にはなっていないので、該ＳＤカードを所定量挿入させて電気的な接続を図ることはできても、例えばアンテナ回路を使用しないときに該ＳＤカードを深く差し込んで収納しておくということができない。すなわち、従来のカード用コネクタ装置を通常品よりも長いＳＤカードに適用させようとすると、ハウジングの挿入空間の開口端から手前へ該ＳＤカードを大きく突出させた状態にしておかねばならないので、外観が悪いというだけでなく、該ＳＤカードをコネクタ装置に装着したままノート型パソコン等の電子装置本体を携帯しなければならず、使い勝手が極めて悪いという問題が起こる。

【０００８】本発明は、かかる従来技術の不備を解消するためになされたものであって、その目的は、長寸のＳＤカードを挿入量の異なる所望の位置に選択的に装着させることができ、使い勝手が良好なカード用コネクタ装置を提供することにある。

【０００９】

【課題を解決するための手段】上述した目的を達成するため、本発明によるカード用コネクタ装置は、外部接続端子群を設けたカード（ＳＤカード）が開口端側から挿入される挿入空間を有し、かつ前記カードを前記挿入空間内への挿入量が小なる第１の装着位置と挿入量が大なる第２の装着位置とに選択的に装着可能なハウジングと、前記外部接続端子群に接触可能な複数の端子片を有して前記挿入空間内の第１の保持位置と第２の保持位置との間で往復移動可能であり、前記第１の保持位置では前記複数の端子片が前記第１の装着位置に装着された前記カードの前記外部接続端子群に接触し、かつ前記第２の保持位置では前記複数の端子片が前記第２の装着位置に装着された前記カードの前記外部接続端子群に接触するヘッダ部材と、前記ヘッダ部材を前記第１の保持位置と前記第２の保持位置とに選択的に保持可能であり、かつ該ヘッダ部材を前記第２の保持位置から前記第１の保持位置へと移動させる機構を有する保持手段と、本体装置から導出されて前記ヘッダ部材の前記端子片群に接続されたケーブルとを備え、前記カードを前記第２の装着位置に装着させる際に、前記第１の保持位置にある前記ヘッダ部材が前記第２の保持位置まで移動するように構成した。

【００１０】このように構成されるコネクタ装置は、短寸のＳＤカードを挿入して第１の装着位置に装着させることができるのみならず、長寸のＳＤカードを第１の装着位置にも第２の装着位置にも装着させることができるので、長寸のＳＤカードを第１の装着位置に装着させれば、例えばそのＳＤカードに内蔵したアンテナ回路を露出させて通信機器として使用でき、また、長寸のＳＤカードを深く差し込んで第２の装着位置に装着させれば、記憶媒体として使用したり携帯に便利な収納状態に保持しておくことができる。そして、第１の装着位置に装着されて外部接続端子群をヘッダ部材の端子片群と接触させている長寸のＳＤカードを、例えば操作者が手指で奥方へ所定量押し込むことにより、該ＳＤカードに駆動されるヘッダ部材を第１の保持位置から第２の保持位置まで移動させて保持手段に保持させることができると共に、該ＳＤカードを第２の装着位置に装着させることができるので、外部接続端子群と端子片群との接触を維持したまま該ＳＤカードを第１の装着位置から第２の装着位置まで移動させることができる。この場合、ＳＤカードは端子片群を乗り越えて第２の装着位置まで移動するわけではないので、円滑に奥方へ押し込むことができる。また、長寸のＳＤカードが第２の装着位置に装着されているときに、保持手段の保持解除動作等によってヘッダ部材を第２の保持位置から第１の保持位置へと移動させることにより、該ＳＤカードをヘッダ部材で駆動して手前へ移動させることができるので、外部接続端子群と端子片群との接触を維持したまま該ＳＤカードを第２の装着位置から第１の装着位置まで円滑に移動させることができる。

【００１１】また、本発明の上述した構成において、前記ケーブルがフレキシブルプリント基板であれば、ヘッダ部材の各端子片との半田付けが容易であるだけでなく、フレキシブルプリント基板を撓ませることにより、ヘッダ部材を第１の保持位置と第２の保持位置との間で

移動させても各端子片と本体装置との接続状態に悪影響が及ばなくなるので、好ましい。その際、各端子片がヘッダ部材の手前側の端部に片持ち梁状に支持されていると共に、フレキシブルプリント基板がハウジングの奥側から手前へ延びて各端子片の固定端部に半田付けされていれば、ハウジングの奥行寸法を抑えた小型化が図りやすくなり、かつフレキシブルプリント基板に可撓性を保証した十分な長さが確保しやすくなる。

【００１２】さらに、本発明の上述したいずれかの構成において、前記保持手段に、前記ヘッダ部材に一体化されたスライダと、このスライダの移動に伴いピン係止部を有するカム溝に沿って移動する係合ピンと、前記スライダをＳＤカードの排出方向へ向けて弾性付勢する付勢部材とを設け、前記係合ピンを前記ピン係止部に係止させると前記スライダの移動が阻止されて前記ヘッダ部材が前記第２の保持位置に保持され、かつ、前記係合ピンを前記ピン係止部から離脱させると前記スライダが前記付勢部材に付勢されて前記排出方向へ移動すると共に、前記ヘッダ部材が前記第２の保持位置から前記第１の保持位置へと移動して該第１の保持位置に保持されるようにしておけば、第１の装着位置に装着されているＳＤカードを操作者が押し込んで、ヘッダ部材を第１の保持位置から奥方へ所定量移動させることにより、係合ピンをカム溝のピン係止部に係止させて該ヘッダ部材を第２の保持位置に保持することができる。また、第２の装着位置に装着されているＳＤカードを操作者が押し込んで、ヘッダ部材を介して係合ピンをピン係止部から離脱させることにより、付勢部材の弾性力で該ヘッダ部材を第２の保持位置から第１の保持位置まで移動させて該第１の保持位置に保持することができる。したがって、ヘッダ部材を第１の保持位置と第２の保持位置とに選択的に保持させたり両保持位置間で移動させる動作を、長寸のＳＤカードを介して簡単かつ円滑に行うことができる。

【００１３】なお、かかる構成において、前記第１の装着位置に装着されているＳＤカードを排出可能な排出手段を備え、この排出手段に、ＳＤカードの挿入排出方向に沿って往復移動可能な第１のスライダと、この第１のスライダの移動に伴い第１のカム溝に沿って移動する第１の係合ピンと、前記第１のスライダを前記排出方向へ向けて弾性付勢する第１の付勢部材と、前記第１のスライダに回動自在に軸支されてＳＤカードに対し前記排出方向への力を付与可能な係合アームと、ＳＤカードの挿入位置が前記第１の装着位置に到達していない場合に前記係合アームの外方への回転を規制する回転規制部と、ＳＤカードが前記第１の装着位置から前記第２の装着位置へ移動する過程で前記係合アームの外方への回転を許容して該係合アームを退避させる回転許容部とを設けておけば、ＳＤカードが第１の装着位置と第２の装着位置の途中まで挿入された段階で係合アームが回転許容部に退避するため、第１のスライダをそれ以上後退させることなく、前記保持手段のスライダを後退させながらＳＤカードをさらに奥方へ押し込んで第２の装着位置へ到達させることができる。したがって、例えば第１の付勢部材がコイルばねであれば、その伸縮量を抑制することができて長寿命化が図れる。

【００１４】また、本発明の上述したいずれかの構成において、挿入排出方向の長さが異なる２種類のＳＤカードに対して、一方の短寸カードを前記第１の装着位置に装着したときに該カードが前記開口端から外方へ突出する寸法と、他方の長寸カードを前記第２の装着位置に装着したときに該カードが前記開口端から外方へ突出する寸法とが略同等となるように、前記第１および第２の装着位置を設定しておけば、外観上の共通化が図れるため使用時の意匠性が向上する。

【００１５】

【発明の実施の形態】発明の実施の形態について図面を参照して説明すると、図１は実施形態例に係るカード用コネクタ装置のカバーを省略して示す平面図、図２は該コネクタ装置のハウジングの平面図、図３は該コネクタ装置のヘッダ部材の平面図、図４は該ヘッダ部材に接続されるフレキシブルプリント基板（以下、ＦＰＣと称する）の平面図、図５は該ＦＰＣを半田付けしたヘッダ部材の平面図、図６は図５に示すヘッダ部材およびＦＰＣの断面図、図７は該コネクタ装置の第１の排出保持機構に設けられたカム溝の説明図、図８は該コネクタ装置の第２の排出保持機構に設けられたカム溝の説明図である。

【００１６】これらの図に示すカード用コネクタ装置は、パソコン等の電子装置に組み付けられてＳＤカードを装着するためのものであり、所定位置に装着したＳＤカードの外部接続端子群を電子装置本体に設けられた電子回路に接続させることができる。そして、このカード用コネクタ装置は、短寸のＳＤカードが装着できるだけでなく、長寸のＳＤカードも装着できるように構成されている。

【００１７】具体的な構成について述べると、このカード用コネクタ装置は、絶縁材料からなるフレーム１と金属材料からなる図示せぬカバーとを組み合わせてなるハウジングと、ＳＤカードの外部接続端子群と接触可能な複数の端子片４を有してフレーム１内で往復移動可能なヘッダ部材３と、電子装置本体から導出されてヘッダ部材３の端子片４群に半田付けされたＦＰＣ５と、フレーム１の一側部に設けられた第１の排出保持機構６と、フレーム１の他側部に設けられた第２の排出保持機構７とによって概略構成されている。

【００１８】前記ハウジングのフレーム１とカバーとの間には、ＳＤカードが開口端８ａ側から挿入される挿入空間８が形成されている。また、図２に示すように、フレーム１の一側部には、第１の排出保持機構６の一部をなすカム溝９と規制壁１０および切欠き１１が形成され

ており、フレーム１の他側部には、第２の排出保持機構７の一部をなすハート型カム溝１２が形成されている。

【００１９】図３に示すように、ヘッダ部材３は、窓孔３０ａや押圧壁３０ｂを有する合成樹脂製のベース体３０に複数の端子片４を片持ち梁状に固設してなるもので、本実施形態例ではインサート成形により端子片４群をベース体３０に固設しているが、ベース体３０の成形後に熱がしめ等で端子片４群を取り付けてもよい。このヘッダ部材３は、第２の排出保持機構７によって挿入空間８内の開口端８ａ寄りの第１の保持位置と奥寄りの第２の保持位置とに選択的に保持可能であると共に、これら両保持位置の間で往復移動可能である。また、図６に示すように、各端子片４の自由端部に形成されている接触部４ａが窓孔３０ａからベース体３０上の空間にせり出しており、かつ、各接触部４ａの相対位置関係がＳＤカードの各外部接続端子の相対位置関係（端子配列）と同等に設定されているので、挿入空間８内に挿入されたＳＤカードの各外部接続端子に各接触部４ａを弾接させることができる。また、ヘッダ部材３の手前側（開口端８ａ側）の端部に支持されている各端子片４の固定端部に、図４に示すＦＰＣ５の各ランド５ａが半田付けされているので、ヘッダ部材３をフレーム１内で前進後退させても、ＦＰＣ５が図６に示すように撓んで各端子片４と電子装置本体との電気的な接続が維持されるようになっている。

【００２０】第１の排出保持機構６は、ＳＤカードを挿入量が小なる第１の装着位置と挿入量が大なる第２の装着位置とに選択的に装着させたり、第１の装着位置に装着されているＳＤカードを排出させるための機構である。そして、ＳＤカードを挿入空間８内の中央部付近まで挿入して第１の装着位置に装着させることにより、その外部接続端子群を前記第１の保持位置に保持されているヘッダ部材３の各端子片４の接触部４ａに接触させることができる。また、ＳＤカードを挿入空間８内の奥部まで挿入して第２の装着位置に装着させることにより、その外部接続端子群を前記第２の保持位置に保持されているヘッダ部材３の各端子片４の接触部４ａに接触させることができる。

【００２１】第１の排出保持機構６の構成について詳しく説明すると、この第１の排出保持機構６は、ＳＤカードの挿入排出方向に沿って往復移動可能な第１のスライダ１４と、このスライダ１４に回動自在に軸支されてＳＤカードの前縁部と係合可能な係合アーム１５と、第１のスライダ１４の移動に伴い前記カム溝９に沿って移動する第１の係合ピン１６と、この係合ピン１６がカム溝９から脱落しないように押えている押え板１７と、ＳＤカードの一側縁に設けられている凹部に係合可能で第１のスライダ１４に保持された第１の弾性片１８と、ＳＤカードの該凹部に係合可能で係合アーム１５に保持された第２の弾性片１９と、第１のスライダ１４をカード排出方向へ向けて弾性付勢する第１のコイルばね２０とを具備している。また、フレーム１の前記規制壁１０および切欠き１１も第１の排出保持機構６の構成要素であり、規制壁１０はＳＤカードの挿入位置が第１の装着位置に到達していない場合に係合アーム１５の外方への回転を規制する。一方、切欠き１１は、ＳＤカードが第１の装着位置から第２の装着位置へ移動する途中で係合アーム１５の外方への回転を許容して、該係合アーム１５を退避させる。

【００２２】また、図７に示すように、カム溝９には、第１の係合ピン１６を係止してＳＤカードを第１の装着位置に保持するためのピン係止部２１ａを有するハート型カム溝２１と、ピン係止部２１ａの上流側でハート型カム溝２１に連通して奥方へ延びる第１の案内溝２２と、ピン係止部２１ａの下流側でハート型カム溝２１に連通して奥方へ延びる第２の案内溝２３と、ＳＤカードが第２の装着位置から第１の装着位置へ移動する過程で第１の係合ピン１６の進路をガイドする帰還路２４と、両案内溝２１，２２および帰還路２４に連通して奥方へ延びる延出路２５とが設けられており、第２の案内溝２３はＳＤカードを第１の装着位置から第２の装着位置へ移動可能にする進出経路となっている。また、帰還路２４内には、この帰還路２４を移動中の第１の係合ピン１６を係止してＳＤカードを第１の装着位置に保持するための戻りピン係止部２４ａが形成されており、この帰還路２４は戻りピン係止部２４ａの下流側で第２の案内溝２３に連通させてある。そして、第１の係合ピン１６がピン係止部２１ａもしくは戻りピン係止部２４ａに係止されているとき、第１のスライダ１４の移動が阻止されるため、第１の弾性片１８を介して該スライダ１４と係合しているＳＤカードが第１の装着位置に保持されるようになっている。

【００２３】一方、第２の排出保持機構７は、ヘッダ部材３を第１の保持位置と第２の保持位置とに選択的に保持したり、第２の保持位置に保持されているヘッダ部材３を第１の保持位置へ移動させるための機構である。この第２の排出保持機構７は、ヘッダ部材３のベース体３０と一体的に成形されてＳＤカードの挿入排出方向に沿って往復移動可能な第２のスライダ２６と、このスライダ２６の移動に伴い前記ハート型カム溝１２に沿って移動する第２の係合ピン２７と、この係合ピン２７がハート型カム溝１２から脱落しないように押えている押え板２８と、第２のスライダ２６をＳＤカードの排出方向へ向けて弾性付勢する第２のコイルばね２９とを具備している。図８に示すように、ハート型カム溝１２にはピン係止部１２ａが形成されており、ＳＤカードが第２の装着位置にあるとき、第２の係合ピン２７が該ピン係止部１２ａに係止されて第２のスライダ２６の移動を阻止するようになっている。また、このとき、前記係合アーム１５に保持された第２の弾性片１９がＳＤカードの凹部

と係合してＳＤカードを第２の装着位置に保持できるようになっている。

【００２４】次に、このように構成されるカード用コネクタ装置の動作を、図９～図１８を参照して説明する。まず、現在広く採用されている短寸のＳＤカード５０よりも長いＳＤカード６０を使用する場合の動作を、図９～図１７を用いて説明する。

【００２５】長寸のＳＤカード６０の挿入方向前端側には、ヘッダ部材３の各端子片４の接触部４ａに接触可能な外部接続端子６１群が設けられている。また、このＳＤカード６０の一側縁には、第１の排出保持機構６の弾性片１８，１９と係合可能な凹部６２が設けられている。かかる長寸のＳＤカード６０は、その幅寸法や外部接続端子６１群の端子配列、および前縁から凹部６２までの距離等が、すべて短寸のＳＤカード５０と同等に設計されている。ただし、長寸のＳＤカード６０の挿入方向後端側には図示せぬアンテナ回路が設けられており、このアンテナ回路をできるだけ良好な感度状態で使用する場合は、後端部分を手前へ露出させた状態でコネクタ装置に装着する必要がある。

【００２６】図９は、本実施形態例に係るカード用コネクタ装置に対して長寸のＳＤカード６０の挿入を開始した直後の平面図であり、この状態でヘッダ部材３は、第２のコイルばね２９の弾性力でフレーム１の開口端８ａ近傍に押し付けられているため第１の保持位置に保持されている。ＳＤカード６０を図９に示す位置まで挿入すると、その凹部６２に第１の弾性片１８が係合してＳＤカード６０の前縁部に係合アーム１５が当接する。したがって、操作者がＳＤカード６０をさらに挿入していくと、フレーム１の規制壁１０によって外方への回転が規制されている係合アーム１５がＳＤカード６０に押し込まれることとなり、第１のスライダ１４および係合アーム１５がＳＤカード６０に追動して奥方へ移動していき、該スライダ１４の移動に伴い、第１の係合ピン１６がハート型カム溝２１に沿って移動していく。

【００２７】そして、ＳＤカード６０を第１の装着位置よりも若干量奥まで押し込むと、図１０に矢印で示すように、第１の係合ピン１６がハート型カム溝２１から第１の案内溝２２へと移動するので、押し込み操作力を除去すれば、第１のコイルばね２０の弾性力で第１のスライダ１４および係合アーム１５が手前へ押し戻されて、第１の係合ピン１６をピン係止部２１ａに係止させることができる。これにより、第１の保持位置に保持されているヘッダ部材３の各端子片４の接触部４ａに外部接続端子６１群を接触させた状態で、ＳＤカード６０が第１の装着位置に保持されることとなり、手前に露出するアンテナ回路を良好な感度状態で使用することが可能となる。

【００２８】また、こうして第１の装着位置に装着されたＳＤカード６０を排出する場合には、図１０の状態のＳＤカード６０を奥方へ浅く押し込んで、第１の係合ピン１６をピン係止部２１ａから離脱させればよい。これにより、第１の係合ピン１６が図９に矢印で示すようにハート型カム溝２１内を下流へ移動するので、第１のコイルばね２０の弾性力で手前へ移動する第１のスライダ１４および係合アーム１５によって、ＳＤカード６０は排出位置まで押し戻される。つまり、操作者は、第１の装着位置に保持されているＳＤカード６０をワンプッシュの簡単な操作で排出させることができる。

【００２９】また、アンテナ回路を露出させるために第１の装着位置に保持していたＳＤカード６０を、第２の装着位置へ移動させて収納状態とする場合には、図１０の状態のＳＤカード６０を操作者が奥方へ押し込んでいく。すると、第１のスライダ１４の移動に伴って、第１の係合ピン１６は図１１に矢印に示すようにハート型カム溝２１から第２の案内溝２３を経て延出路２５へと移動していく。また、ＳＤカード６０が図１１の位置まで挿入された時点で、係合アーム１５がＳＤカード６０に押されながら外方へ回転してフレーム１の切欠き１１内へ退避するので、係合アーム１５の奥方への移動が規制される。そのため、ＳＤカード６０がさらに奥方へ押し込まれても、第１のスライダ１４は停止したままであり、第１の弾性片１８はＳＤカード６０の凹部６２から離脱する。しかし、ＳＤカード６０を第１の装着位置から奥方へ押し込んでいくと、その前縁部がベース体３０の押圧壁３０ｂを押し込むので、ＳＤカード６０の奥方への移動に追動してヘッダ部材３および第２のスライダ２６が奥方へ移動していき、それに伴い第２の係合ピン２７がハート型カム溝１２に沿って移動していく。なお、こうしてヘッダ部材３がＳＤカード６０に押し込まれると、両者３，６０は一体的に移動するので、各端子片４の接触部４ａと外部接続端子６１群との接触が途切れることはない。

【００３０】そして、ＳＤカード６０を第２の装着位置よりも若干量奥まで押し込むことにより、第２の係合ピン２７がハート型カム溝１２内を図１２に矢印で示すように移動するので、押し込み操作力を除去すれば、第２のコイルばね２９の弾性力でヘッダ部材３および第２のスライダ２６が手前へ押し戻され、第２の係合ピン２７をピン係止部１２ａに係止させることができ、これによりヘッダ部材３が第２の保持位置に保持されることとなる。また、この状態で、ＳＤカード６０の凹部６２には第２の弾性片１９が入り込んで係合している。つまり、第２の保持位置に保持されているヘッダ部材３の各端子片４の接触部４ａに外部接続端子６１群を接触させた状態で、ＳＤカード６０が第２の装着位置に保持されることとなる。なお、こうして第２の装着位置に装着させることにより、ＳＤカード６０を手前に大きく突出することのない収納状態となすことができるが、受信状況がよければかかる収納状態のままアンテナ回路を使用するこ

ともできる。

【００３１】また、第２の装着位置に保持していた収納状態のＳＤカード６０を第１の装着位置へ移動させる場合には、図１２の状態のＳＤカード６０を奥方へ浅く押し込めばよい。これにより、第２の係合ピン２７がピン係止部１２ａから離脱して、図１３に矢印で示すようにハート型カム溝１２内を下流へ移動するので、第２のコイルばね２９の弾性力でヘッダ部材３および第２のスライダ２６が手前へ移動し、よってＳＤカード６０が押圧壁３０ｂに付勢されて手前へ移動する。その結果、切欠き１１に退避していた係合アーム１５が内方へ回転して第１のスライダ１４が手前へ移動するので、図１４（ａ）に示すように第１の係合ピン１６が延出路２５から帰還路２４へと移動し、さらに図１４（ｂ）に示すように第１の係合ピン１６が帰還路２４の戻りピン係止部２４ａに係止されてＳＤカード６０が第１の装着位置まで押し戻される。この状態で、ヘッダ部材３は第１の保持位置まで戻って保持されている。つまり、操作者は、第２の装着位置に保持されているＳＤカード６０を、ワンプッシュの簡単な操作で第１の装着位置まで移動させて、アンテナ回路を露出させた状態に設定することができる。しかも、ＳＤカード６０を第２の装着位置から第１の装着位置へ移動する過程で、外部接続端子６１群と各端子片４の接触部４ａとの接触が途切れることはないので、例えば収納状態でアンテナ回路を使用しているときに感度が低下した場合、ＳＤカード６０に対するワンプッシュの操作のみでアンテナ回路を露出させて瞬時に感度を高めることができ、使い勝手が格段に良好となる。なお、図１０～図１４を見れば明らかなように、第１の係合ピン１６の通過する経路は、ＳＤカード６０が第１の装着位置から第２の装着位置へ移動する場合と、逆に第２の装着位置から第１の装着位置へ移動する場合とで異なっている。

【００３２】こうしてＳＤカード６０を第２の装着位置から第１の装着位置まで移動させてアンテナ回路を露出させた状態とした後、再びＳＤカード６０を第２の装着位置へ移動させる場合、操作者はＳＤカード６０を奥方へ深く押し込めばよい。これにより、図１５（ａ）～（ｃ）に示すように、戻りピン係止部２４ａに係止されていた第１の係合ピン１６が第２の案内溝２３を経て延出路２５へと移動していくので、そのままＳＤカード６０を押し込んでいけば図１１の状態を経て図１２の状態へ移行する。また、第２の装着位置から第１の装着位置まで移動させてアンテナ回路露出状態としたＳＤカード６０を排出させる場合には、操作者はＳＤカード６０を奥方へ浅く押し込んでから操作力を除去すればよい。これにより、図１６（ａ）～（ｃ）に示すように、戻りピン係止部２４ａに係止されていた第１の係合ピン１６が第２の案内溝２３の途中まで移動した時点で、第１のコイルばね２０の弾性力によって第１のスライダ１４および係合アーム１５が手前へ押し戻されることになるので、第１の係合ピン１６がハート型カム溝２１を下流へと進み、ＳＤカード６０を排出させることができる。

【００３３】また、挿入したＳＤカード６０をすぐに収納したい場合には、ＳＤカード６０を第１の装着位置を通り越していきなり第２の装着位置に装着させることもできる。すなわち、挿入したＳＤカード６０を奥方へ深く押し込んでいくと、図１７の矢印に示すように、第１の係合ピン１６がハート型カム溝２１から第１の案内溝２２を経て延出路２５へと移動していくので、そのままＳＤカード６０を押し込んでいけば図１１の状態を経て図１２の状態へ移行する。

【００３４】次に、このカード用コネクタ装置に短寸のＳＤカード５０を使用する場合の動作を、図１８を参照して説明する。なお、図１８は、短寸のＳＤカード５０を第１の装着位置に装着した状態を示している。

【００３５】図１８に明らかなように、短寸のＳＤカード５０は奥方の第２の装着位置までは挿入できないので、第１の装着位置のみに装着可能である。また、前述したように、短寸のＳＤカード５０と長寸のＳＤカード６０とは、その幅寸法や外部接続端子群の端子配列等が共通化されている。したがって、図９，１０を用いて説明した動作、つまり、長寸のＳＤカード６０を挿入して第１の装着位置に装着させたり、第１の装着位置に装着されている長寸のＳＤカード６０を排出させる場合の動作と、まったく同等の動作が行われることとなる。すなわち、操作者が短寸のＳＤカード５０をフレーム１の挿入空間８内へ押し込んでいくと、第１の係合ピン１６がハート型カム溝２１を通って第１の案内溝２２へ移動し、押し込み操作力が除去されると該係合ピン１６はハート型カム溝２１に戻ってピン係止部２１ａに係止されるため、ＳＤカード５０を第１の装着位置に装着させることができる。また、図１８の状態でＳＤカード５０を操作者が浅く押し込むと、ピン係止部２１ａに係止されていた第１の係合ピン１６が第２の案内溝２３へ移動するので、押し込み操作力が除去されると該係合ピン１６はハート型カム溝２１を下流へと進んで、ＳＤカード５０を排出させることができる。

【００３６】このように本実施形態例によれば、短寸のＳＤカード５０を第１の装着位置に装着して使用できるのみならず、長寸のＳＤカード６０を第１および第２の装着位置に選択的に装着して使用することができる。そして、長寸のＳＤカード６０であっても、これを奥方の第２の装着位置に装着すれば収納状態となすことができるので、外観を損なったり携帯に支障をきたす心配はない。しかも本実施形態例では、図１８および図１２に示すように、第１の装着位置に装着させた短寸のＳＤカード５０の後端部が手前に突出する寸法Ｌ１と、第２の装着位置に装着させた長寸のＳＤカード６０の後端部が手前に突出する寸法Ｌ２とが略同等となるように、これら

第１および第２の装着位置を設定しているので、外観上の共通化が図れて使用時の意匠性が損なわれない。

【００３７】また、本実施形態例では、第１の装着位置に装着されているＳＤカードを排出できる第１の排出保持機構６と、第２の装着位置に装着されているＳＤカードをヘッダ部材３を介して手前へ移動可能な第２の排出保持機構７とを設けていると共に、ＳＤカードを第２の装着位置へ押し込む過程でヘッダ部材３が該ＳＤカードに駆動されて一体的に移動し、よって外部接続端子６１群が端子片４群を乗り越えなくて済むようにしてあるので、第１のコイルばね２０の伸縮量を抑制することができて長寿命化が図れ、かつ、ＳＤカードを第２の装着位置に装着する際に、過度な押し込み操作力を必要とせず良好な操作性が期待できる。すなわち、長寸のＳＤカード６０を第１の装着位置と第２の装着位置との間で簡単かつ円滑に往復移動させることができるので、例えば、アンテナ回路を良好な感度状態で使用したいときだけ該ＳＤカード６０を第１の装着位置に装着しておき、それ以外のときは該ＳＤカード６０を第２の装着位置に装着した収納状態にしておくという実用的な使い方が容易に行える。しかも、長寸のＳＤカード６０を第１の装着位置と第２の装着位置との間で移動させる途中で、その外部接続端子６１群とヘッダ部材３の端子片４群との電気的接続が途切れることがないので、操作者はアンテナ回路の受信状況等に応じてＳＤカード６０を所望の装着位置に随時移動させることができ、使い勝手がよい。

【００３８】また、本実施形態例では、各端子片４がヘッダ部材３の手前側の端部に片持ち梁状に支持されていて、フレーム１の奥側から手前へ延びるＦＰＣ５を各端子片４の固定端部に半田付けしているので、フレーム１の奥行寸法を抑えた小型化が図りやすく、ＦＰＣ５にも可撓性を保証した十分な長さが確保しやすい。

【００３９】

【発明の効果】本発明は、以上説明したような形態で実施され、以下に記載されるような効果を奏する。

【００４０】短寸のＳＤカードを挿入して第１の装着位置に装着させることができるのみならず、長寸のＳＤカードを第１の装着位置にも第２の装着位置にも装着させることができるカード用コネクタ装置なので、汎用性に優れ実用的価値も高い。例えば、長寸のＳＤカードにアンテナ回路が形成されている場合、操作者は携帯時等には該ＳＤカードを深く差し込んで第２の装着位置に収納しておき、アンテナ回路を露出させたいときには該ＳＤカードを手前へ突出させて第１の装着位置に装着させるという使い方が可能となる。

【００４１】また、長寸のＳＤカードの外部接続端子群とヘッダ部材の端子片群との接触を維持したまま、該ＳＤカードを第１の装着位置と第２の装着位置との間で往復移動させることができ、かかる移動時に該ＳＤカードは端子片群を乗り越える必要がないので、本体装置との電気的接続を保ったまま該ＳＤカードを第１および第２の装着位置間で円滑に移動させることができる。例えば、操作者はアンテナ回路の受信状況等に応じて長寸のＳＤカードを所望の装着位置に随時移動させることができるので、使い勝手が良好となる。

【００４２】また、ヘッダ部材の手前側の端部に各端子片を片持ち梁状に支持し、これら端子片群をＦＰＣによって本体装置と接続しておけば、各端子片の固定端部とＦＰＣとの半田付けが容易であるだけでなく、ＦＰＣを撓ませることにより、ヘッダ部材を第１の保持位置と第２の保持位置との間で移動させても各端子片と本体装置との接続状態に悪影響が及ばなくなるので、信頼性が高まる。しかも、こうすることでハウジングの奥行寸法が低減できるので、コネクタ装置の小型化が図りやすくなる。

【図面の簡単な説明】

【図１】本発明の実施形態例に係るカード用コネクタ装置を示す平面図である。

【図２】該コネクタ装置のハウジングの平面図である。

【図３】該コネクタ装置のヘッダ部材の平面図である。

【図４】該ヘッダ部材に接続されるＦＰＣの平面図である。

【図５】該ＦＰＣを半田付けしたヘッダ部材の平面図である。

【図６】図５に示すヘッダ部材およびＦＰＣの断面図である。

【図７】該コネクタ装置の第１の排出保持機構に設けられたカム溝の説明図である。

【図８】該コネクタ装置の第２の排出保持機構に設けられたカム溝の説明図である。

【図９】長寸のＳＤカードが挿入されている該コネクタ装置の動作説明図である。

【図１０】長寸のＳＤカードが挿入されている該コネクタ装置の動作説明図である。

【図１１】長寸のＳＤカードが挿入されている該コネクタ装置の動作説明図である。

【図１２】長寸のＳＤカードが挿入されている該コネクタ装置の動作説明図である。

【図１３】長寸のＳＤカードが挿入されている該コネクタ装置の動作説明図である。

【図１４】長寸のＳＤカードが挿入されている該コネクタ装置の動作説明図である。

【図１５】長寸のＳＤカードが挿入されている該コネクタ装置の動作説明図である。

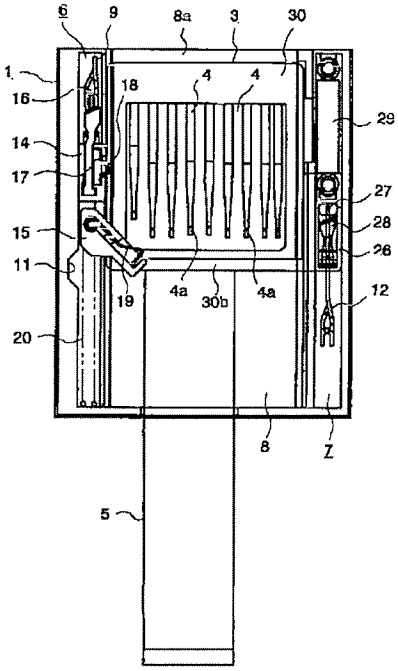
【図１６】長寸のＳＤカードが挿入されている該コネクタ装置の動作説明図である。

【図１７】長寸のＳＤカードが挿入されている該コネクタ装置の動作説明図である。

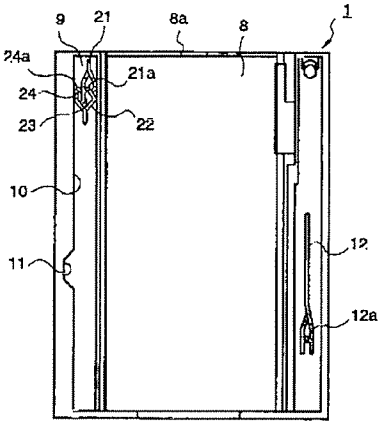
【図１８】短寸のＳＤカードが挿入されている該コネクタ装置の動作説明図である。

【符号の説明】
1　フレーム（ハウジング）
2ａ　半田付け部
3　ヘッダ部材
4　端子片
4ａ　接触部
6　第１の排出保持機構（排出手段）
7　第２の排出保持機構（保持手段）
8　挿入空間
8ａ　開口端
9　カム溝
１０　規制壁（回転規制部）
１１　切欠き（回転許容部）
１２　ハート型カム溝
１４　第１のスライダ
１５　係合アーム
１６　第１の係合ピン
２０　第１のコイルばね
２１　ハート型カム溝
２１ａ　ピン係止部
２２　第１の案内溝
２３　第２の案内溝
２４　帰還路
２４ａ　戻りピン係止部
２５　延出路
２６　第２のスライダ
２７　第２の係合ピン
２９　第２のコイルばね
３０　ベース体
３０ａ　窓孔
３０ｂ　押圧壁
５０　短寸のＳＤカード
６０　長寸のＳＤカード
６１　外部接続端子

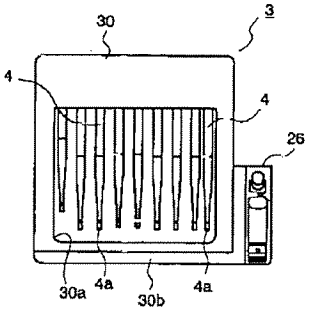
【図１】



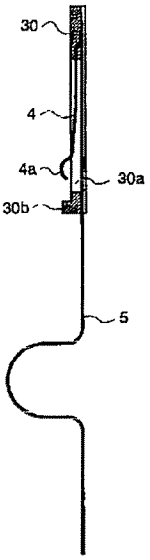
【図２】



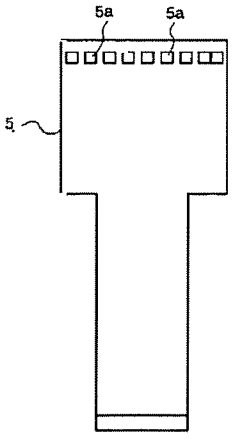
【図３】



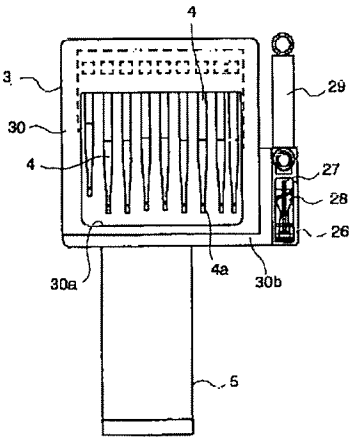
【図６】



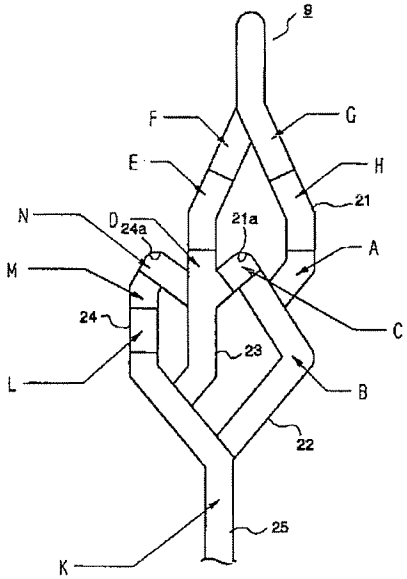
【図４】



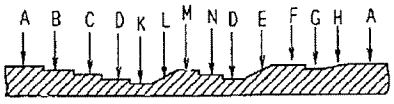
【図５】



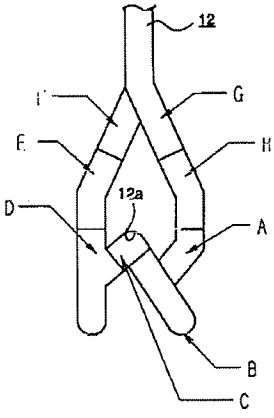
【図7】



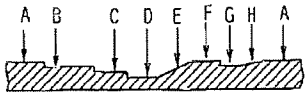
(各部の高さ)



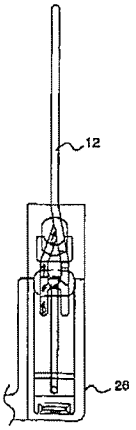
【図8】



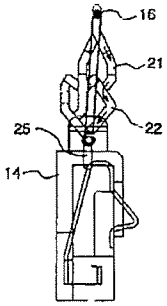
(各部の高さ)



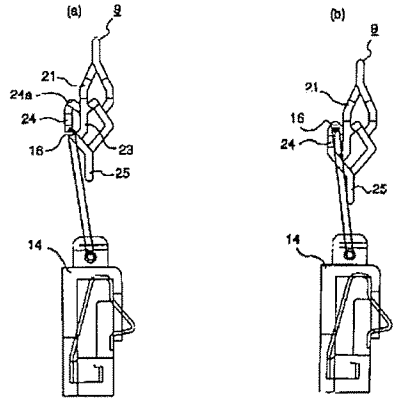
【図13】



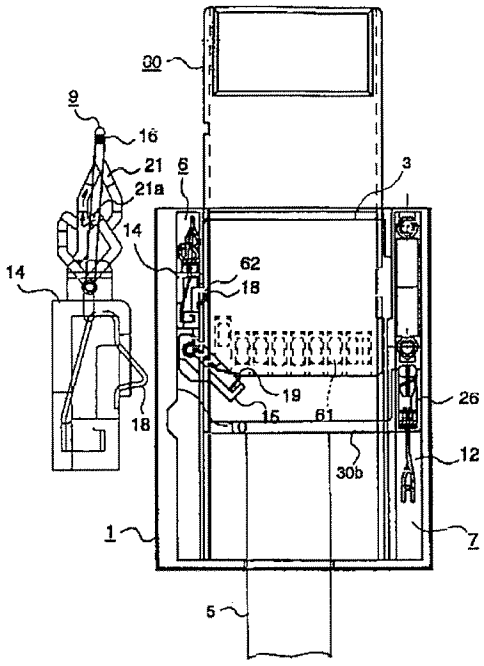
【図17】



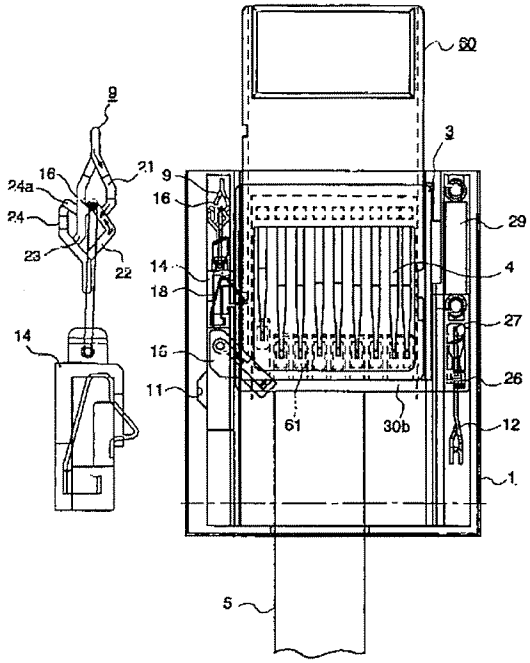
【図14】



【図9】



【図10】



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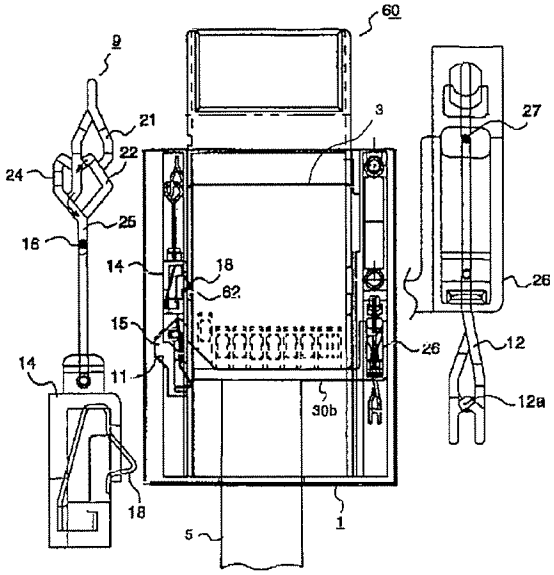

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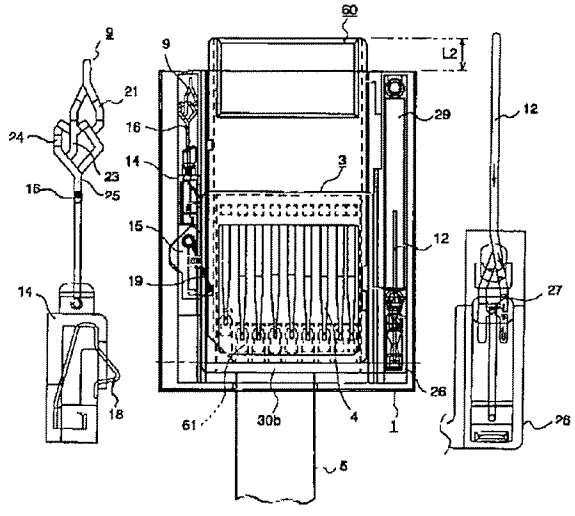

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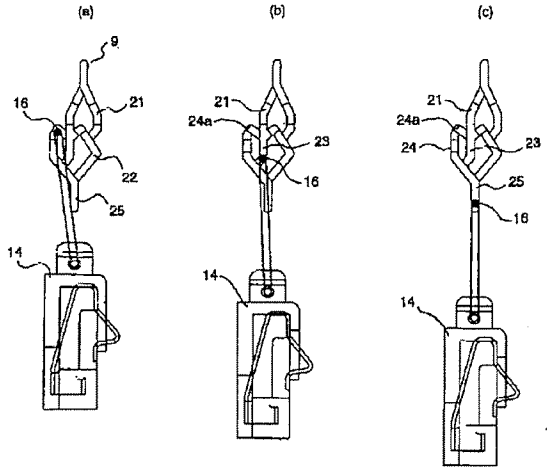

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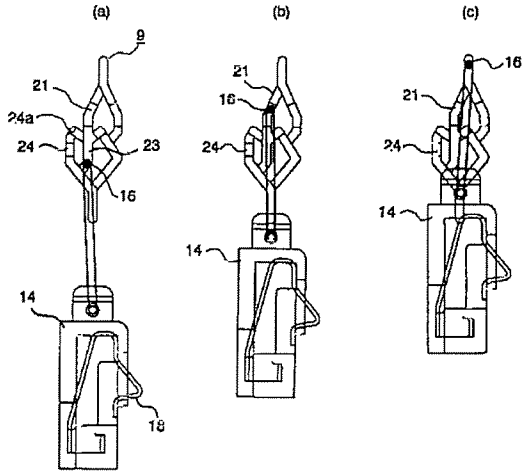

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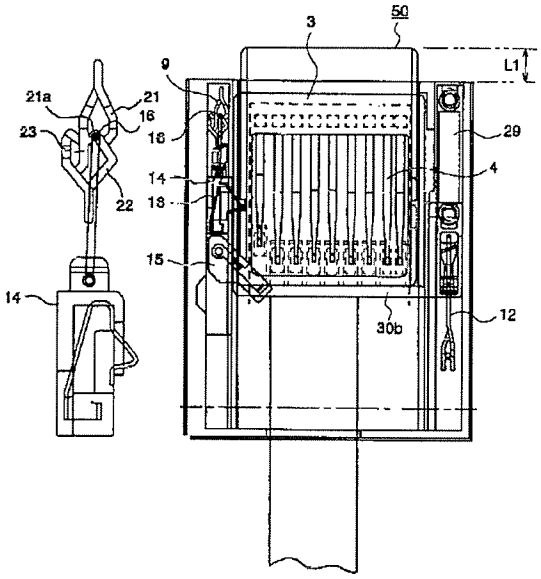

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5E023 AA04 AA21 BB19 BB23 CC21
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EF26 EH03